Adams, Karen K NAE

From: Polly Espy [pollyespy@nyc.rr.com]
Sent: Thursday, February 24, 2005 7:00 PM
To: Energy, Wind NAE
Subject: Cape Wind Project

To Karen Kirk-Adams

As Massachusetts taxpayers and Nantucket residents we are very concerned about the Cape Wind project.Nantucket Sound is a national treasure! An individual should not be able to gain control of public property for personal financial gain. In addition
Cape Wind project creates hazardous conditions for navigation of fishing boats, ferry service to the island, and the air traffic to a very busy airport.

We strongly oppose the creation of this Cape Wind project.

Sincerely, Dr. & Mrs. John W. Espy

004412

Adams, Karen K NAE

From: Lauren Bell [info@capewind.org]
Sent: Thursday, February 24, 2005 6:36 PM
To: Energy, Wind NAE
Subject: wind park project on Horseshoe Shoal

004413

Dear Ms. Karen Kirk-Adams:

I support the Cape Wind Project. Here in Somerville, we can often see the emissions from the local power plant leaving a yellow-brown trail on the blue sky. Imagine looking out at one's power source and not seeing smoke of any kind! While some might complain of the view, I think it is one of beauty and progress. This country has wasted too much time dragging its feet behind other nations when it comes to advancement in the energy sector. I grew up in Ohio, where coal plants pollute the sky and air inversions frequently contain the pollution within the valley where so many people live. Cape Wind is a huge step in the right direction!

Sincerely,

Lauren Bell
8 Madison St
Somerville, MA 02143

cc:
Capewind

Adams, Karen K NAE

From: Erika Barko [ebarko@gmail.com]
Sent: Thursday, February 24, 2005 6:41 PM
To: Energy, Wind NAE
Subject: Wind Energy

004414

Dear Karen Kirk-Adams:

I strongly support the Cape Wind Project because of the health impact mentioned in the report to save New Englanders $53,000,000 from less disease. Also, I believe the structures are beautiful.

Thank you,
Erika Barko

Adams, Karen K NAE

From: Carol/David Knapton [cdknapton@hotmail.com]
Sent: Thursday, February 24, 2005 6:44 PM
To: Energy, Wind NAE

004415

We are totally in favor of this wonderful clean energy technology, and are very hopeful that Cape Wind will be a reality. Carol is asthmatic and allergic to hydrocarbons and diesel fumes. We both worry about LNG tankers near Boston, about the cost of electricity and oil, and the possibility of offshore rigs. In 2000, we were entranced by the many miles of graceful wind turbines on Rte. 84 near Livermore, California. These turbines are not ugly; they look like modern art! What is ugly are oil rigs and tankers and oil spills and noxious power plants spoutin fumes.

Carol and David Knapton
100 Lawton Road
Needham, MA 02492

Adams, Karen K NAE

From: Robert Perry [rperry@worcester.edu]
Sent: Thursday, February 24, 2005 6:46 PM
To: Energy, Wind NAE
Subject: wind park project on Horseshoe Shoal

Dear Ms. Karen Kirk-Adams:

I own a home in Chatham. I enthusiastically support the construction of windmills in the Sound. You can't have it both ways. If you want electricity you need a method of production. Wind is by far the least damaging to the environment. Complaints about looking bad or damaging birds are absurd. The fishermen who complain about the looks of the windmills have no problem with the ugly weirs that they drop all over the sound. The bird lovers have no problem with things they want to use, jet planes for example, killing birds. We make more dangerous nuclear plants, burn more fossil fuel, or put up sleek, interesting widmills. It's a nobrainer; get going on the windmills.

004416

Dr. Robert J. Perry
Professor of Mathematics
Worcester State College

Sincerely,

Robert Perry
2538 Main St
South Chatham, MA 02659

cc:
Capewind

Adams, Karen K NAE

From: Robert H. Russell [Rusty.Russell@tufts.edu]
Sent: Thursday, February 24, 2005 7:01 PM
To: Energy, Wind NAE
Subject: wind park project on Horseshoe Shoal

004417

Dear Ms. Karen Kirk-Adams:

I write briefly to add my voice to the chorus of support for the development of meaningful windpower in coastal waters, and in particular for the Cape Wind project. Many ironies attend -- not the least of which the extent to which political leaders have failed to exercise leadership skills and essentially have caved in to the pressure of a minority and wealthy landowners, without due regard for the interests of the millions of people who stand to benefit from the environmental relief that clean renewables provide. It is also ironic that the project developer, Cape Wind, is continually castigated for obtaining a public resource for free and for planning to make a profit. First of all, Cape Wind has agreed to play by the rules and pay reasonable royalties, but that fee hasn't been set apparently because it amuses politicians to point the finger at Cape Wind than to do their jobs. Second, American energy policy is almost entirely relegated to private sector entrepreneurs -- enterprising firms like Cape Wind. It's quite a spectacle to witness public officials acting as though this weren't so and that energy developers should have no pecuniary motive. As for those who claim they like windpower, just not here: Cape Wind's primary site is perhaps the best current offshore site in the nation. It offers the strongest winds, the shallowest waters and the least degree of regulation from a state whose top officials have shown an inexplicable lack of understanding and leadership with regard to a project that deserves public support. Finally, need one mention the irony of the United States invasion of Iraq? Would we be there if the nation had no oil? (The answer is No -- where was the U.S. when Pol Pot ruled Cambodia?). U.S. militarism may succeed tactically, but it will fail strategically. Instead, we must develop a credible renewable threat -- and that cannot be done without capturing the wind.

Sincerely,

Robert H. Russell
9 Spruce Avenue
Cambridge, MA 02138

cc:
Capewind

Adams, Karen K NAE

From: Loretta Mickley [ljm@io.as.harvard.edu]
Sent: Thursday, February 24, 2005 6:59 PM
To: Energy, Wind NAE
Cc: mepa@state.ma.us; pdascombe@capecodcommission.org
Subject: Cape Wind comments

004418


valiela_2003.pdf


birdwatchersguide.pdf


mickley_press.pdf


mickley_2004.pdf

Dear Ms. Adams,

I am writing to express my support of the Cape Wind project.

As an atmospheric chemist, I am keenly aware of the possible consequences of continued emissions of power plants. The carbon dioxide emitted by power plants leads undeniably to climate change, and the emissions of particulates and precursors of ozone are harmful to human health. The Cape Wind project offers a healthy alternative to power plants.

I wish to raise 2 issues overlooked in the Cape Wind controversy.

1. Climate change adversely affects bird habitats.

For example, looking at 70 years of records in Cape Cod, scientists have discovered a northward shift in the winter ranges of bird species. According to the research, this "massive and windspread" shift is due mainly to global warming.

References (attached):
Valiela, I., and J.L. Bowen, Shifts in winter distribution in birds: effects of global warming and local habitat change, Ambio, November, 2003.

Price, J., and P. Glick, The birdwatcher's guide to global warming, National Wildlife Federation and American Bird Conservancy, 2002.

2. Future climate change will bring more persistant pollution episodes to the Northeast United States.

This is my own research finding. My work shows that even if emissions of particles and ozone precursors are kept constant, pollution episodes could last twice as long in some regions of the U.S. as the climate warms.

References (attached):
Press release for The Pollution-Climate Connection, presentation at the annual meeting of the American Association for the Advancement of Science, February 19, 2005.

Mickley, L.J., D.J. Jacob, B.D. Field, and D. Rind, Effects of future climate change on regional air pollution episodes in the United States, Geophysical Research Letters, December, 2004.

Thank you for your consideration of these issues.

Sincerely,

Dr. Loretta J. Mickley

Loretta Mickley, Div Engineering & Applied Science, Harvard University
29 Oxford St, Cambridge, MA 02138 tel:617-496-5635 fax:617-495-4551
email: ljm@io.harvard.edu web: www.people.fas.harvard.edu/~mickley

Article Ivan Valiela and Jennifer L. Bowen

Shifts in Winter Distribution in Birds: Effects of Global Warming and Local Habitat Change

As global warming intensified toward the end of the 20th century, there was a northward shift in winter ranges of bird species in Cape Cod, Massachusetts, USA. These poleward shifts were correlated to local increases in minimum winter temperatures and global temperature anomalies. This evidence, plus other recent results, suggests that during the last two decades global warming has led to massive and widespread biogeographic shifts with potentially major ecological and human consequences. Local habitat changes associated with urban sprawl affected mainly forest birds with more northern winter distributions. In Cape Cod, the effects of warming on bird distributions are more substantial at the start of the 21st century, than those of habitat alteration, but as urban sprawl continues its importance may rival that of global warming.

INTRODUCTION

It has become evident that much of the surface of the globe has become human-dominated (1). Major agents of ecological change include atmospheric warming at global spatial scales (2, 3), and extensive but local-scale conversion of natural habitats to land covers such as suburban sprawl (4-6). The evidence for such global and local-scale changes is compelling, raising the question whether these changes are sufficient to affect organisms (7, 8), and whether globally-driven changes can overwhelm local changes from other sources (9-11). In this paper, we use long-term bird censuses to evaluate the relative effects of globally-driven increases in winter temperatures, and of local changes in habitats, on assemblages of birds overwintering on Cape Cod, Massachusetts, USA.

METHODS

The Cape Cod Christmas Bird Count of overwintering birds, currently run under the sponsorship of the National Audubon Society, spans a relatively long period (70 years). This count is the oldest of the censuses that are done every December within 15-mile diameter geographical areas throughout the Commonwealth of Massachusetts. For many of the initial years the census in the Cape Cod circle (Fig. 1, inset map) were directed by Dr. L. Griscom of Harvard University, one of the founders of American ornithology. His successors in managing and performing the counts include some of the elite within the Massachusetts birding community. The well-honed identification ability of these skilled observers guarantees that species counts are a robust aspect of these censuses. The censuses also report numbers of each species, but these values are not as consistently taken as the species identification.

To evaluate the relative effect of global warming trends, we hypothesized, based on previous results, that the winter distribution ranges may be controlled by the cold extremes of temperature regimes (12, 13). Thus, we obtained data on the mean minimum temperature that occurred annually from October to February from the National Weather Service (http://www.nws.noaa.gov/information_center.html). If warming was biologically meaningful we would find that southern species sensitive to cold winters would extend their winter-range poleward during the warming period, and that species with more northern ranges might be able to survive winter farther north. The net result would be a shift in the ratio of southern to northern species. To assess this possibility, we used maps of winter geographical range (14, 15) for each bird species recorded in the censuses. We examined the range between northern and southern extremes of the distribution relative to Cape Cod, and classified each species as of northern or southern winter distribution depending on whether the wintering range was mostly north or south of Cape Cod.

Across the decades, the Christmas Bird Counts have included different numbers of observers and kilometers driven and walked, differed in distances traveled by boat, and changes in routes taken within the count circles; for example, counts during World War II (1941-1945) were significantly undermanned. Normalizing for all these variables would yield data that were, in our view, too distant from real bird species numbers. Instead, we compensated for such methodological differences by focusing on internal comparisons within the data sets, such as the number of species with southern winter distribution (S) relative to the number of northern species (N), rather than on total numbers of species. Increases in S/N would suggest that overwintering ranges have extended northward. This would be evidence that climate-related changes were making it possible for species to survive winters at more northerly latitudes than in previous decades.

There is an additional feature that simultaneously complicates the interpretation of the census data, but also makes for a more interesting comparison. In Cape Cod, as in virtually all the shorelines of the world, there have been remarkable changes in land use during recent decades (6, 16, 17). In the first half of the 1900s, the Cape Cod area recovered its forested cover from the near complete pasture it was during the mid 1800s. During the second half of the 20th century, the landscape of Cape Cod, as elsewhere, has undergone a marked shift away from forests and agriculture to urban land uses (Fig. 1, 16-18). Thus, within the Christmas Count census circles urbanization has reduced forested area, increased edge habitats associated with residential land-use habitats and natural and man-made turf and agricultural land covers, but left aquatic and grassland areas largely unchanged (Fig. 1, inset graph). These changes in land covers mean that the assemblage of overwintering birds – particularly those species preferring forest and edge habitats – might not only be responding to global-scale temperature-related changes, but also to local changes in the mosaic of habitats they find available for winter use (19).

To assess the relative effects of local changes in habitats for overwintering birds, *vis a vis* the global climate-related changes, we compared the number of southern and northern species of birds that prefer habitats (aquatic, grasslands) that

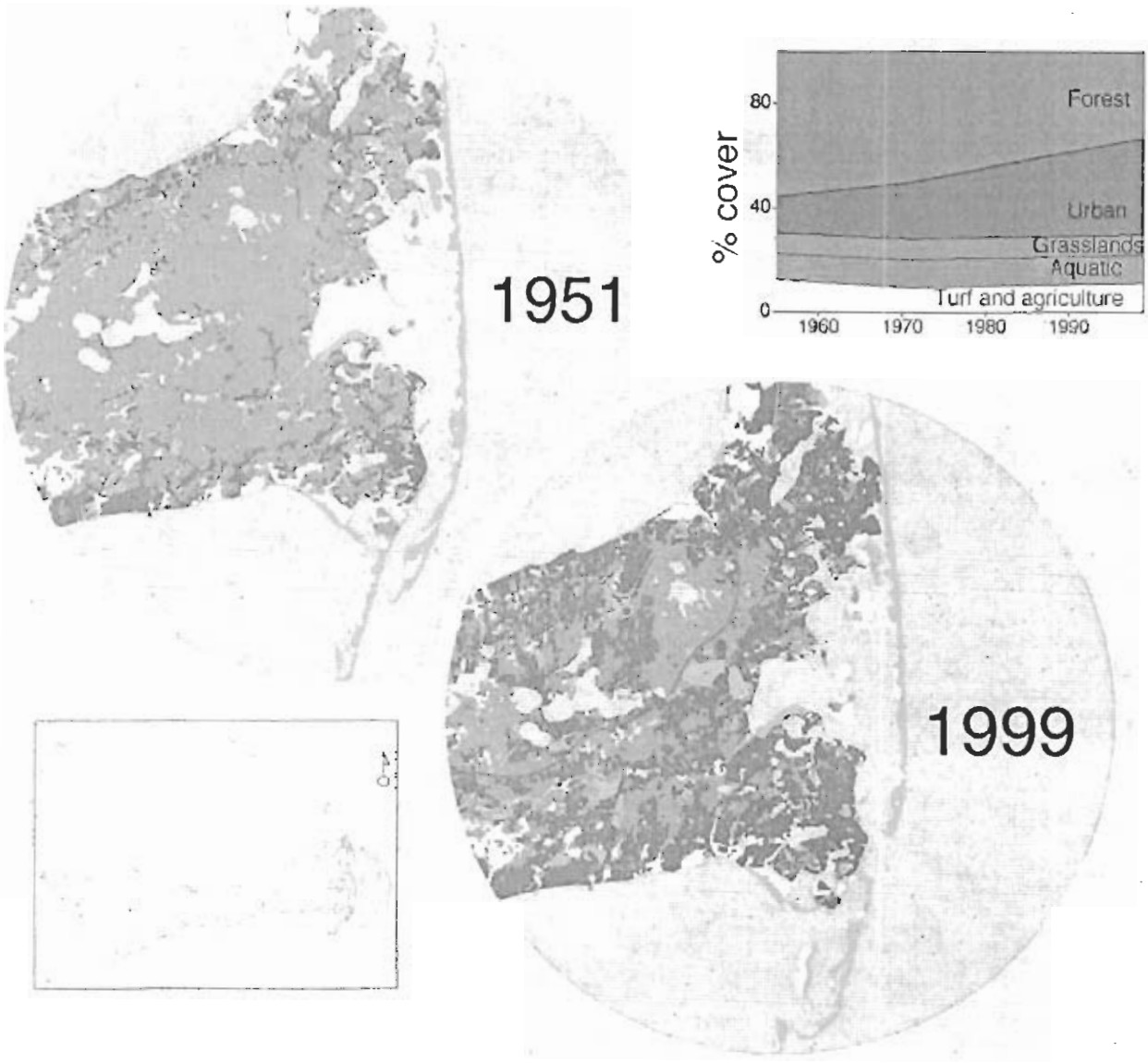


Figure 1. Changes in land-cover type, 1951 and 1999 (maps in circles), on the Christmas Census Circle. Color code: green = forest, red = urban, purple = grasslands, blue = aquatic, and yellow = turf and agriculture. Cartography for the maps and data by T. Stone and G. Fiske of the Woods Hole Research Center, Woods Hole, MA, from data provided by MassGIS. The location of the Cape Cod circle within Cape Cod is shown in the inset on lower left. The % of the area within the circle covered by each land-cover type (data available from 1951, 1971, 1985, and 1999), is shown in the inset on upper right.

did not change in recent decades, with birds that preferred habitats (forests, edge) whose areas changed significantly (Fig. 1, inset). To carry out this comparison, we used our own field experience, as well as Peterson (14) and Sibley (15) to assign each species found in the censuses into groups with given habitat preferences: edge (including shrub-woodlands, suburban developments, parklands), grassland (including wetlands, dunes, old fields), forest, and aquatic (including ponds, lakes, estuaries, and open sea) (Table 1). These classifications are certainly over-simple, but do provide general guidelines while being few enough that there were enough species in each category for meaningful patterns to emerge. In a minority of cases, species habitat preferences – for example, edge *versus* forest – were not clear cut; in such instances we applied our field experience to assign the species to one habitat or another. We would conclude that changes in habitat significantly alter distributions if changes in the number of overwintering species that prefer a specific habitat parallel changes in the area of that habitat.

RESULTS AND DISCUSSION

The number of bird species found in the Cape Cod census increased from the 1930s through the century (Fig. 2A). Some of the increase must be a result of changes in observation procedures, some might be owing to global atmospheric changes, and some to local habitat changes. There were always more species with southern winter distributions, probably simply a reflection of greater species richness at lower latitudes (Fig. 2A).

To sort out effects of climatic warming from effects of differences in census procedures, we used the internal comparison, calculating numbers of species with southern distributions relative to those with northern distribution for each year of the record (S/N, Fig. 2B). S/N varied from 1930 to about 1970; after 1970 there was a clear increase in S/N, from about 2.5 to 5 (Fig. 2B).

Bird assemblages found during any one winter at a site are likely to be affected by local as well as by global temperature regimes, since species need to survive at a local site, but many species do migrate across a broad latitudinal range from south and

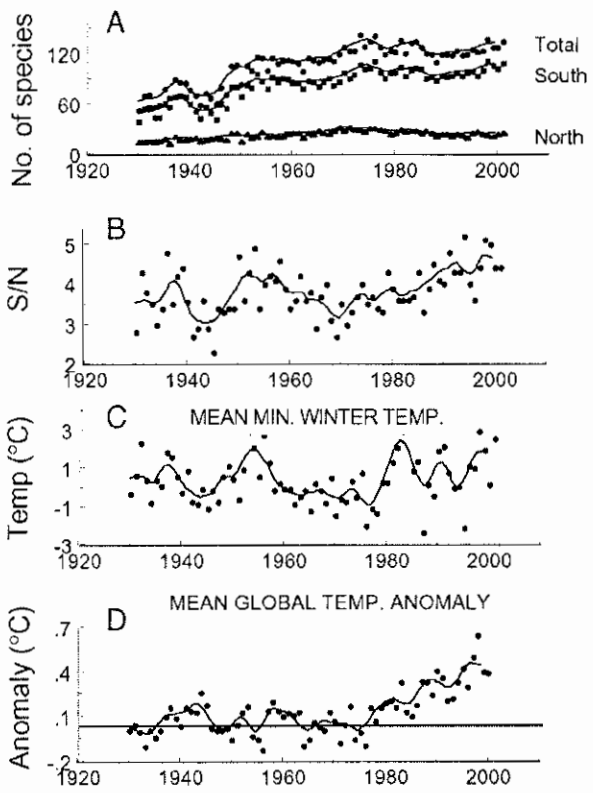


Figure 2. A: Time course of the total number of wintering bird species, and number of species with southern and northern winter distributions (relative to the latitude of Cape Cod), recorded in the Cape Cod Christmas Count survey from 1930 to 2001. Points represent each year, trends are lowest fits calculated with a decadal tension. Data for this figure compiled from the National Audubon Society (http://www.audubon.org/bird/cbc/).
B: Ratio of number of bird species with southern distributions to those with northern distributions in the Cape Cod Christmas Counts, 1930-2001. Points represent each year, trends are lowest fits calculated with a decadal tension.
C: Mean minimum winter temperature recorded in Provincetown, Cape Cod, Massachusetts, 1930-2001. This Cape Cod site is 45 km from the Cape Cod Christmas Count circle.
D: Mean global temperature anomaly, calculated as the difference between a year's mean global temperature relative to the mean for all years in the record. Data from the National Climate Center, NESDIS, National Oceanic and Atmospheric Administration.

central North America (7). Accordingly, we compared the time course of S/N to contemporaneous changes in local (Fig. 2C) and global (Fig. 2D) temperature regimes. Local mean minimum winter temperatures were highly variable, but there was a suggestion that in the last two decades of the 20th century, local temperatures were not as cold as earlier in the century. This warming trend was much clearer in the global temperature anomalies (Fig. 2D).

The ratio of southern to northern species in the Cape Cod censuses was well-correlated to local and global temperature regimes (Fig. 3A). Increases in local mean minimum winter temperatures during 1930-1990 were accompanied by increases in S/N (Fig. 3). The ratio also increased during the 1990s, with a similar slope, but that relationship was offset upwards. The upwards offset is unexplained, but may be related to recent short-term but large-scale regional warming, allowing significantly more species from additional southern areas to move northward. S/N also responded to global temperature anomalies (Fig. 3B). During decades when the anomaly remained low (< 0.1°C 1930-1970), the ratio varied with no evident pattern; after the onset of heat forcing following the 1970s (global temperature anomalies > 0.1°C), the values of the ratio emerge from the cluster of points, and clearly increase as global-scale forcing increased the temperature anomaly (Fig. 3B). These results suggest that local amelioration of winters, as well as global-scale warming, have been followed by clear shifts in the winter avifauna of Cape Cod, with southern species becoming relatively more common, and northern species less so. This is consistent with the notion (20-22) that as the world warms, we will find a poleward shift of species ranges.

The number of southern and northern species associated with aquatic, edge, grassland, and forest habitats changed across the decades (Fig. 4). The number of species with southern affinities increased across all habitat preferences, presumably largely as a result of global warming. The increases in southern species among habitat types were not contemporaneous, suggesting the influence of other unidentified mechanisms (Fig. 4). Changes in the number of southern species, however, seemed unrelated to changes in local habitats, since the increase took place even in the case of aquatic species whose preferred habitats did not change materially in area. The number of northern species increased somewhat from 1920-1970, and decreased after the 1970s. Forest birds increased up to the 1970s, perhaps a reflection of the recovery of forests from earlier pastureland, but the post-1970 decrease was particularly evident in the case of forest-dwelling birds (Fig. 4). Surprisingly, the edge species showed increases similar to those affecting species preferring other habitats, even though urbanized areas have increased significantly, forming more edge habitat (Fig. 1). Thus the comparisons across habitats suggest that the local land-cover changes (for example, loss of about 20% of forest area (Fig. 1, inset) may have mainly affected northern forest-loving species after the 1970s.

On the whole, the pattern across the decades of the 20th century suggests that the numbers of species preferring different habitats showed similar time courses, with changes more closely linked to warmer temperature anomalies (Fig. 3) than to changes in areas of the different habitats (Fig. 4), except for northern species associated with forest habitats. Even though the landscape of Cape Cod has changed materially during the 20th century (Fig. 1), the resulting habitat changes on Cape Cod seem not to have been large enough as yet to match the larger impact of global warming trends, at least insofar as the composition of the overall wintering avifauna is concerned (23). Of course, greater urban sprawl will have proportionately larger effects, and at some point may have effects that match or even overwhelm those of global warming.

The results of this report make evident that temperature-related forcing, as well as local changes in habitat distribution created by urban sprawl, have altered the composition of winter bird assemblages on Cape Cod. While this report was in review, Parmesan and Yohe (24) published evidence that although local influences were important, a globally-coherent fingerprint of northward shifts in distributions for 219 species of a remarkably widespread range of organisms. Similar changes were reported for other organisms (20-22, 24-26). Our data, and these recent results, inevitably lead to the conclusion that we might be witnessing a phenomenon that is affecting not only birds, but a wide variety of other organisms – viruses, bacteria, invertebrates, fish, agricultural crop species, and many other taxa. If this pattern is general, we might expect to find a massive poleward shift of species across the world. These results suggest that we might be in the midst of massive global-scale biological changes, changes that are not only relevant to those interested in species distributions, but could have major consequences for many other aspects, including fisheries, agriculture, and public health

Table 1. Species of birds identified in the Cape Cod Christmas Bird Counts (1930-2001), with our assignation as to geographical winter ranges with southern (S) and northern (N) affinities, and habitat preferences (A: aquatic, E: edge, W: woods, and G: grassland). Scientific names for the species can be found in Sibley (15).

Species	Geographical affinity	Habitat preference	Species	Geographical affinity	Habitat preference	Species	Geographical affinity	Habitat preference
Common Loon	N	A	Purple Sandpiper	N	A	Carolina Wren	S	E
Pacific/Arctic Loon	S	A	Red Knot	S	A	Marsh Wren	S	G
Red-throated Loon	S	A	Dunlin	S	A	Sedge Wren	S	G
Red-necked Grebe	N	A	Sanderling	S	A	Golden-crowned Kinglet	S	W
Horned Grebe	S	A	Semipalmated Sandpiper	S	A	Ruby-crowned Kinglet	S	W
Pied-billed Grebe	S	A	Western Sandpiper	S	A	Blue-gray Gnatcatcher	S	E
Northern Fulmar	N	A	Least Sandpiper	S	A	Eastern Bluebird	S	E
Sooty Shearwater	N	A	Pomarine Jaeger	S	A	Hermit Thrush	S	W
Cory's Shearwater	N	A	Parasitic Jaeger	S	A	American Robin	S	E
Greater Shearwater	S	A	Long-tailed Jaeger	N	A	Loggerhead Shrike	S	E
Leach's Storm-Petrel	N	A	Laughing Gull	S	A	Northern Shrike	N	E
Northern Gannet	S	A	Bonaparte's Gull	S	A	Gray Catbird	S	E
Great Cormorant	N	A	Common Black-headed Gull	N	A	Northern Mockingbird	S	E
Double-crested Cormorant	S	A	Ring-billed Gull	S	A	Brown Thrasher	S	E
American Bittern	S	G	Herring Gull	S	A	Water Pipit	S	G
Black-crowned Night-Heron	S	A	Glaucous Gull	N	A	Bohemian Waxwing	N	W
Yellow-crowned Night-Heron	S	A	Iceland Gull	N	A	Cedar Waxwing	N	E
Green-backed Heron	S	A	Lesser Black-backed Gull	S	A	European Starling	S	E
Little Blue Heron	S	A	Great Black-backed Gull	N	A	Orange-crowned Warbler	S	E
Snowy Egret	S	A	Black-legged Kittiwake	N	A	Nashville Warbler	S	E
Great Egret	S	A	Common Tern	S	A	Black-and-White Warbler	S	W
Great Blue Heron	S	A	Razorbill	N	A	Cape May Warbler	S	E
Mute Swan	S	A	Common Murre	N	A	Yellow-rumped Warbler	S	E
Snow Goose	S	A	Thick-billed Murre	N	A	Yellow-throated Warbler	S	W
Canada Goose	S	A	Dovekie	N	A	Prairie Warbler	S	E
Brant	S	A	Black Guillemot	N	A	Blackpoll Warbler	S	W
Mallard	S	A	Atlantic Puffin	N	A	Pine Warbler	S	W
American Black Duck	S	A	Turkey Vulture	S	E	Palm Warbler	S	E
Gadwall	S	A	Bald Eagle	S	A	Ovenbird	S	W
Green-winged Teal	S	A	Northern Harrier	S	W	Northern Waterthrush	S	W
American Wigeon	S	A	Sharp-shinned Hawk	S	E	Common Yellowthroat	S	E
Northern Pintail	S	A	Cooper's Hawk	S	W	Yellow-breasted Chat	S	E
Northern Shoveler	S	A	Northern Goshawk	N	W	Rose-breasted Grosbeak	N	W
Blue-winged Teal	S	A	Red-shouldered Hawk	S	W	Northern Cardinal	S	E
Ruddy Duck	S	A	Red-tailed Hawk	S	E	Painted Bunting	S	E
Wood Duck	S	A	Rough-legged Hawk	N	G	Rufous-sided Towhee	S	E
Canvasback	S	A	American Kestrel	S	E	Grasshopper Sparrow	S	G
Redhead	S	A	Merlin	S	E	LeConte's Sparrow	S	G
Ring-necked Duck	S	A	Peregrine Falcon	S	G	Sharp-tailed Sparrow	S	A
Greater Scaup	N	A	Gyrfalcon	N	G	Seaside Sparrow	S	G
Lesser Scaup	S	A	Ruffed grouse	N	W	Vesper Sparrow	S	G
King Eider	N	A	Northern Bobwhite	S	E	Savannah Sparrow	S	G
Common Eider	N	A	Ring-necked Pheasant	N	E	Song Sparrow	S	E
Black Scoter	N	A	Rock Dove	S	E	American Tree Sparrow	S	E
White-winged Scoter	N	A	Mourning Dove	S	E	Field Sparrow	S	E
Surf Scoter	N	A	Common Barn Owl	S	E	Chipping Sparrow	S	E
Harlequin Duck	N	A	Short-eared Owl	S	G	Dark-eyed Junco	S	E
Oldsquaw	N	A	Long-eared Owl	S	E	White-throated Sparrow	S	E
Barrow's Goldeneye	N	A	Great Horned Owl	S	W	White-crowned Sparrow	S	E
Common Goldeneye	S	A	Barred Owl	S	W	Fox Sparrow	S	E
Bufflehead	S	A	Snowy Owl	N	G	Lincoln's Sparrow	S	G
Common Merganser	S	A	Eastern Screech-Owl	S	W	Swamp Sparrow	S	G
Red-breasted Merganser	S	A	Northern Saw-whet Owl	N	W	"Ipswich" Sparrow	S	G
Hooded Merganser	S	A	Belted Kingfisher	S	A	Lapland Longspur	N	G
King Rail	S	G	Red-bellied Woodpecker	S	E	Snow Bunting	N	G
Clapper Rail	S	G	Northern Flicker	S	E	Eastern Meadowlark	S	G
Virginia Rail	S	G	Red-headed Woodpecker	S	E	Red-winged Blackbird	S	G
Sora	S	G	Yellow-bellied Sapsucker	S	W	Rusty Blackbird	S	E
Yellow Rail	S	G	Downy Woodpecker	S	E	Brown-headed Cowbird	S	E
American Coot	S	A	Hairy Woodpecker	S	W	Common Grackle	S	E
American Oystercatcher	S	A	Western Kingbird	S	E	Northern Oriole	S	E
Semipalmated Plover	S	A	Eastern Phoebe	S	E	Baltimore Oriole	S	E
Piping Plover	S	A	Horned Lark	S	G	House Sparrow	S	E
Black-bellied Plover	S	A	Tree Swallow	S	E	Pine Siskin	N	W
Killdeer	S	G	Blue Jay	S	E	American Goldfinch	S	E
Marbled Godwit	S	A	American Crow	S	E	Red Crossbill	N	W
Willet	S	A	Tufted Titmouse	S	E	White-winged Crossbill	N	W
Greater Yellowlegs	S	A	Black-capped Chickadee	N	E	Pine Grosbeak	N	W
Lesser Yellowlegs	S	A	Boreal Chickadee	N	W	Common Redpoll	N	E
Red Phalarope	S	A	Brown Creeper	S	W	Purple Finch	S	E
Long-billed Dowitcher	S	A	White-breasted Nuthatch	S	E	House Finch	N	E
Common Snipe	S	G	Red-breasted Nuthatch	S	W	Evening Grosbeak	N	W
American Woodcock	S	E	House Wren	S	E			
Ruddy Turnstone	S	A	Winter Wren	S	W			

Figure 3. Ratio of number of bird species with southern to northern winter distributions in the Cape Cod Christmas Counts (Fig. 2B), plotted *versus* mean winter temperatures (Fig. 2C) to examine effects of local temperature changes (Fig 2A), and *versus* global temperature anomalies (Fig. 2D), to assess effects of global temperature changes (bottom panel). Regressions for top panel are $y = 0.18x - 2.29$, $F = 98.3^{**}$, $R^2 = 0.65$, for 1930-1980 and $y = 0.18x - 1.5$, $F = 28.9^{**}$, $R^2 = 0.83$ for 1990s.

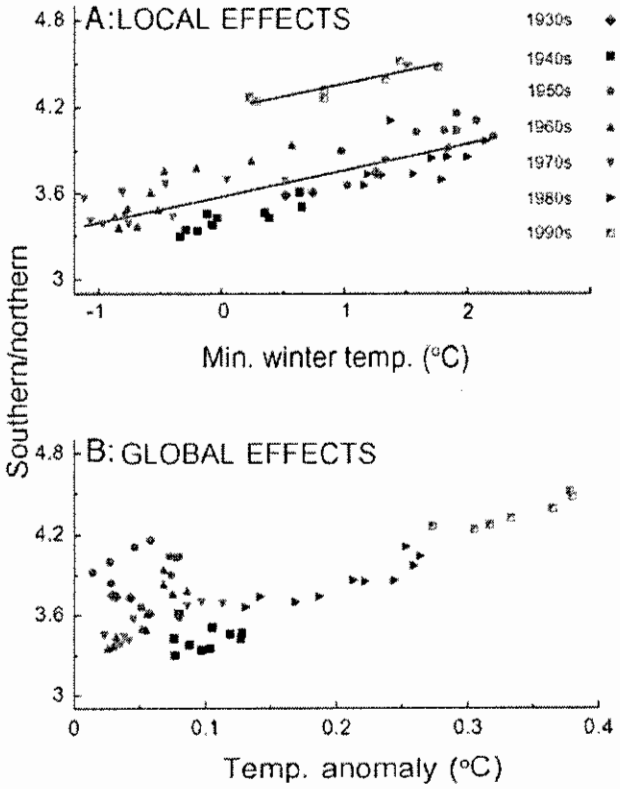
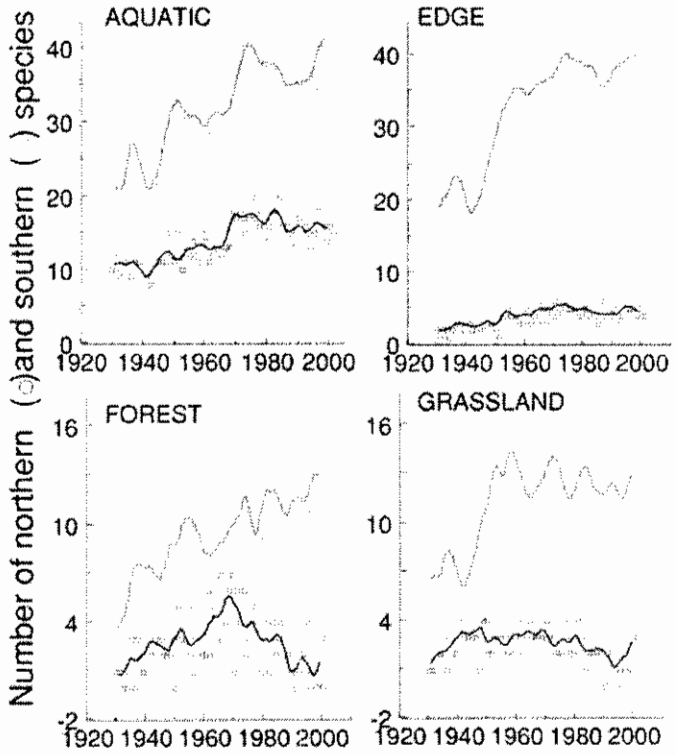


Figure 4. Time course of the number of bird species preferring aquatic (ponds, lakes, estuaries, open ocean), edge (shrub-woodlands, suburban residential areas, parklands), forest, and grassland (wetlands, dunes, old fields) habitats in the Cape Cod Christmas Counts, 1930-2001. The number of species with southern and northern winter ranges are shown to allow internal comparisons within the counts. Points represent each year, trends are lowest fits calculated with a decadal tension.



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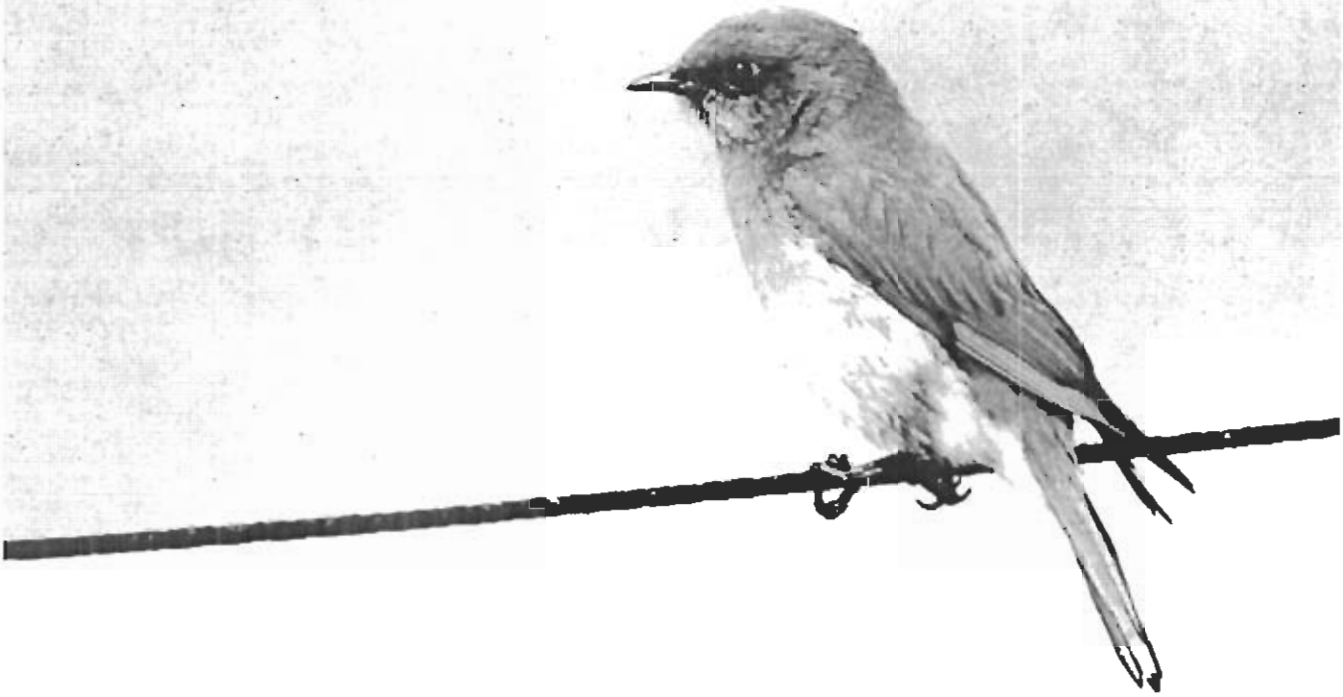
The Birdwatcher's Guide to Global Warming



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The Birdwatcher's Guide to Global Warming

Report Prepared by:

Jeff Price, Ph.D., American Bird Conservancy
Patricia Glick, M.S., National Wildlife Federation

Foreword

Birds, by their very existence, enhance our daily lives. For many of us, it is a thrill to see the splash of a Brown Thrasher in a birdbath, or the flash of red in green woods as a tanager darts past. It is a gift of nature that such birds – which play an important role in healthy ecosystems by controlling pests, dispersing seeds, and pollinating plants – are also so beautiful and such a joy to watch. More than sixty-three million Americans are birdwatchers, injecting billions of dollars into local economies throughout the nation as they purchase birdseed, binoculars, and guidebooks and venture into outdoor environments that are made so much more welcoming by the sights and songs of birds. But, as nature's indicators, birds are also showing signs that our environment is changing.

Human activity – particularly the burning of fossil fuels such as coal, oil, and natural gas – is sending tremendous additional quantities of carbon dioxide and other heat-trapping greenhouse gases into the atmosphere. The buildup of these gases is causing the planet to heat up and is altering the basic climate systems to which nature is adapted. There is a growing body of scientific evidence that some birds (as well as plants and other wildlife) are already responding to the changing climate.

As we explain in this report, recent studies indicate that this global warming could affect birds in many ways, shifting their distributions and altering their migration behavior and habitat, and even diminishing their survival ability. In some places, we may no longer see our favorite birds – as many as 33 states could see a significant reduction in American Goldfinches in the summer! As birdwatchers, we enjoy seeing the same birds we have always cherished in our backyards or on a favorite hike. What's more, we understand that if a bird's range shifts even a few miles, it can have a trickle-down effect for wildlife sharing its ecosystem.

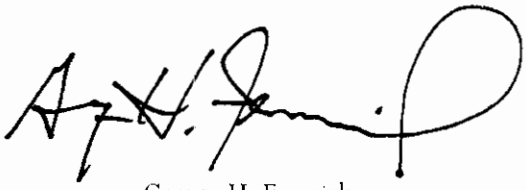
We highlight these potential impacts not to cause alarm, but rather to inform and educate the nature-lover in us all and, we hope, to inspire action. Like other environmental problems, we *can* do something about global warming. More than forty years ago, biologist Rachel Carson warned in her classic work, *Silent Spring*, that if pesticide use continued as it had for the previous 20 years, bird populations across the nation would decline and even disappear. Spring would be silent, empty of the

call of birds. We responded then with new laws to bring about the safer development and use of pesticides. Spring still dances to the songs of birds. While there are still many concerns about pesticides, we have made great progress since Carson's day. We can make the same progress with global warming. If not, then we once again run the risk of the songs of spring being diminished, signaling a wider threat to other wildlife, ecosystems, and people as well.

Although the mere thought of trying to deal with a problem big enough to change the climate of the entire world can be paralyzing, the solution is promisingly simple — reduce emissions of greenhouse gases. We can begin at home by making energy efficiency part of our purchasing decisions. We can support adoption of better fuel economy standards for new vehicles and the increased use of clean, alternative energy sources such as solar power and fuel cells. And we can urge Congress to enact caps on emissions of greenhouse gases from major sources such as power plants.

Above all, we must recognize what our beloved songbirds are telling us – global warming threatens our own backyards, and we must begin to confront it.

Mark Van Putten
President & Chief Executive Officer
National Wildlife Federation



George H. Fenwick
President
American Bird Conservancy

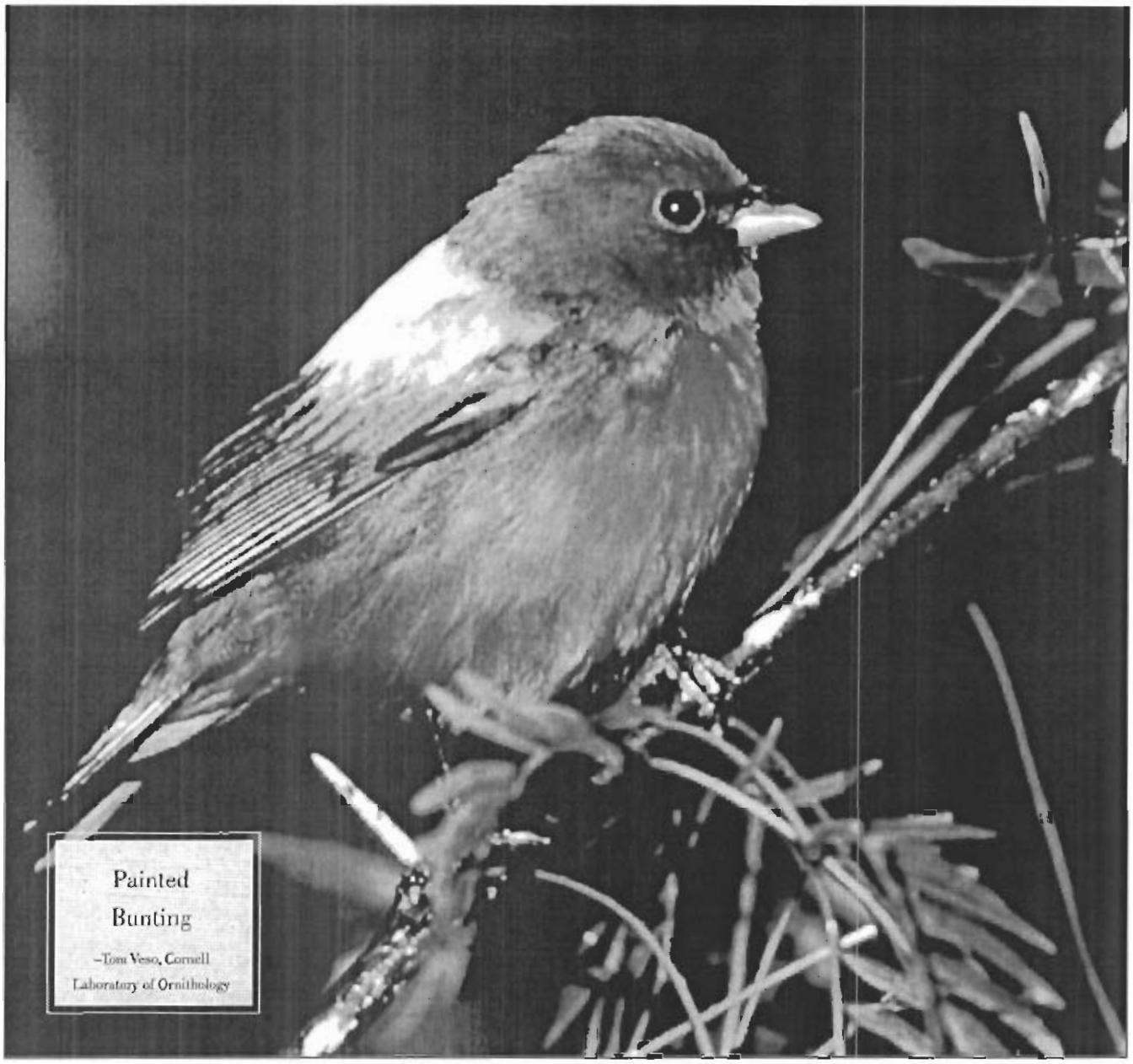
Introduction

It has been more than 67 years since Roger Tory Peterson completed his original *Field Guide to the Birds*, which remains today a quintessential guide to the brilliant birds whose habitat we share. Whether this classic volume will continue to be relevant for generations to come, however, will depend on our ability to become better stewards of our natural world.

Throughout the 20th century, we made great strides in protecting the nation's environment. We have set aside lands as wilderness, parks, and refuges, reduced air and water pollution, and developed strategies to restore threatened and endangered species. Without these efforts, we may well have lost forever much of the wildlife and wild places we know and love.

But our work is not finished. We continue to see signs that natural systems are in great peril, at home and around the world. Species are declining at an ever-increasing pace, and birds are no exception. A total of 1,111 birds (11 percent of the world's bird species) are considered to be at risk, as many as 200 of which may disappear within the next 20 years (Collar, et al. 1994; BirdLife International 2000). The United States ranks among the top ten countries in terms of the total number of vulnerable bird species.

To date, the primary threat to birds worldwide has been habitat loss and fragmentation. Neotropical migratory species have lost millions of acres of winter habitat in Mexico, Central and South America as forests have been cleared to make way for agriculture, cattle grazing, and other development. They are also losing important habitat here in the United States, where human activities are destroying the forests, grasslands, and wetlands they use as stopovers and


Painted
Bunting
–Tom Veso, Cornell
Laboratory of Ornithology

summering grounds. As a result, many of these species' populations have dropped significantly. For example, in the past 25 years the number of Cerulean Warblers, which depend on mature, contiguous forests, has dropped by 70 percent. And the brightly-colored Painted Bunting has declined by 50 percent.

The plight of the nation's birds has inspired ongoing efforts to reverse the situation. Through local, national, and international conservation policies, and programs focused largely on reducing air and water pollution and protecting and restoring important habitat, we *have* had conservation successes – the sight of a Bald Eagle soaring overhead is a welcome reminder of what we can accomplish. But we must also look ahead. Despite welcome progress, we continue to lose ground every day as wildlife habitat is destroyed. Moreover, it is becoming increasingly clear that we could lose much more if we do not also begin to address the very real and potentially devastating problem of global warming. It is not any one factor alone, but rather the combination of these threats that will ultimately be the most consequential environmental danger to birds, and the greatest conservation challenge of the coming century [Intergovernmental Panel on Climate Change (IPCC) 2001b].

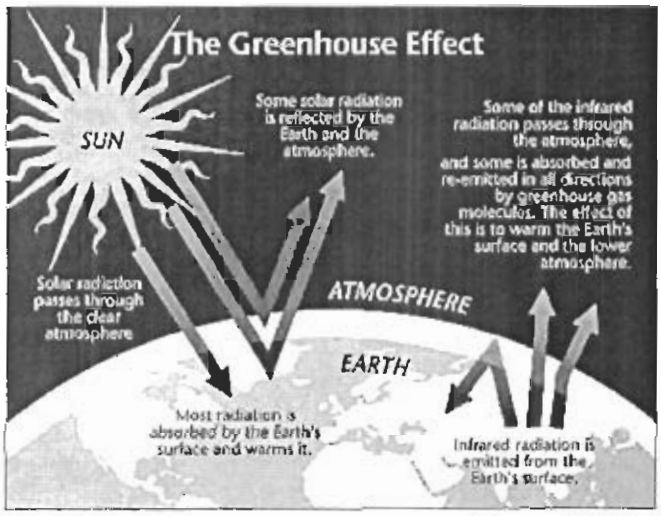
Scarlet Tanager—Dan Sudia Bird Photos

The Problem of Global Warming

Global warming, also frequently referred to as climate change, is not just a theory or a distant threat.[1] The overwhelming agreement among the world's preeminent scientists and scientific bodies is that the Earth is heating up and that human activities are largely to blame [IPCC 2002; IPCC 2001a; National Research Council (NRC) 2001a]. This global warming is expected to significantly disrupt the planet's climate system by altering the exchange of water among the oceans, atmosphere, and land. As a result, regional temperatures and precipitation patterns will shift, affecting nearly every aspect of the Earth's ecological systems -- and the people and wildlife that depend on them.

There is evidence that the late-20th century pattern of global warming is already having an effect on wildlife, including birds. Many of the songbird species we see and enjoy in nature, for example, are shifting their ranges and migrating earlier, often making it more difficult for them to find food such

[1] The terms "global warming" and "climate change" are often used synonymously. According to the United Nations Framework Convention on Climate Change (UNFCCC), climate change is defined as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (UNFCCC 1992).



Source: USGCRP

as insects, flowers, and berries when they need it. Since songbirds play a critical role in ecosystems by eating insects, pollinating plants, and dispersing seeds, such changes risk throwing ecosystems off balance. Models show that these shifts are likely to worsen unless global warming is abated.

The good news is that solutions are not a distant dream either. There are things each of us can do in our homes and businesses, and actions our governments can take, that will help solve this problem.

What is Global Warming?

Gases such as carbon dioxide (CO_2), methane, nitrous oxide, and water vapor in the atmosphere naturally trap solar heat and keep some of it from radiating off the Earth's surface back into space. Without this "greenhouse effect," our planet would be about 60 degrees cooler and unable to support life as we know it. However, since the start of the Industrial Revolution, humans have been interfering with this natural balance by sending tremendous additional quantities of these heat-trapping greenhouse gases into the atmosphere as we burn coal, oil, and gas in our power plants, cars, and factories. Additionally, expanses of CO_2-absorbing forests have been destroyed, limiting the ability of the Earth's natural systems to regulate some of these gases.[2] As a result, too much CO_2 and other greenhouse gases are building up in the atmosphere, essentially creating a "blanket" trapping excess heat near the Earth's surface (an effect known as global warming).[3]

The Earth's surface temperature warmed more during the last century than any other century during the last thousand

[2] Put very simply, forests and other terrestrial ecosystems play an important role in the global "carbon cycle" by taking in carbon dioxide as part of the photosynthesis process. Deforestation and other land use changes take away a potential "sink" for some of the excess carbon dioxide that human activities are pumping into the atmosphere. Moreover, when forests are removed by burning, additional carbon dioxide locked up in the trees' wood is returned to the environment (Manchester Metropolitan University 2004).

[3] Human activities have already contributed to a significant increase in greenhouse gas concentrations in the atmosphere. Since the mid-1800s, the atmospheric concentration of CO_2 has risen more than 30 percent and is now higher than it has been in the last 400,000 years (U.S. Global Change Research Program (USGCRP) 2003). In addition, nitrous oxide is up about 17 percent, and methane has more than doubled (IPCC 2001a).

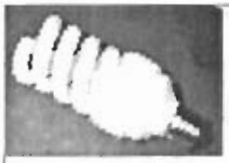
years [World Meteorological Organization (WMO) 2000]. Moreover, 1998 was the warmest year on record, and 7 of the top 10 warmest years all occurred in the 1990s. Unless we begin to deal with the problem by implementing responsible policies to reduce greenhouse gas emissions, global temperatures will rise even more rapidly in the coming decades.

According to the IPCC, an international body composed of the world's top climate scientists, atmospheric concentrations of greenhouse gases, in the absence of effective global warming policies, will continue to increase significantly during the next century. Climate models project that *average* surface temperatures will rise an additional 2.5 to 10.4 degrees Fahrenheit by 2100—more than ten times faster than what has been the average rate of natural sustained global temperature change since the last ice age (IPCC 2001a; Root and Schneider 2002). This rapid global warming is expected to disrupt the Earth's climate, altering regional temperature and precipitation patterns, and possibly increasing the severity of storms. In addition, global average sea level is projected to rise due to thermal expansion of the oceans and the melting of some glaciers and ice caps (IPCC 2001a).

Golden-cheeked Warbler
U.S. Fish and Wildlife Service

How Might Global Warming Affect Us Here at Home?

For the United States, global warming and associated climate change could have a significant impact on natural systems. Recently, the United States government completed a comprehensive study of the impacts of climate change here at home (USGCRP 2000). According to the report, vulnerable systems such as alpine meadows in the Rocky Mountains and coastal wetlands and estuaries could disappear in some places as global warming continues. In the Gulf Coast and mid-Atlantic regions, sea-level rise could destroy important habitat for migratory shorebirds and lead to flooding, erosion, and property damage. Several native species of trees may no longer be able to grow in some areas as summers become warmer. For example, maple-dominated hardwood forests in the northeastern United States could give way to forests dominated by oaks and conifers, which are more tolerant of higher temperatures. This could reduce the brilliance of fall foliage and disrupt the maple syrup industry.



That bird perched atop a power line in your neighborhood should be a reminder that our energy choices affect the wildlife around us. Historically, fossil fuels have enabled us to gain light and mobility, cooling and heat. But their use has also polluted our environment, causing smog and acid rain, poisoning our waters with mercury and other toxics, and contributing to global warming. It doesn't have to stay that way. We have the ingenuity to move toward a clean, sustainable energy future, and starting may be as simple as changing a light bulb. If every household in the United States replaced its most commonly-used incandescent light bulbs with more efficient compact fluorescent bulbs, electricity use for lighting could be cut in half, lowering our total annual CO_2 emissions by approximately 125 billion pounds (Geller 2001). This action alone would significantly slow the growth in CO_2 emissions from the United States. Moreover, it would save each consumer at least $25 over the lifetime of the bulb [U.S. Environmental Protection Agency (U.S. EPA) 2002].

More importantly, global warming is an added stress to wildlife that must already cope with environmental problems such as habitat fragmentation, pollution, and the introduction of exotic and invasive species. We know from experience that human intervention on natural cycles tends to have a ripple effect of negative consequences. Global warming may well be our greatest global experiment yet. Unfortunately, once we know for sure the consequences, it may be too late. Greenhouse gases that we emit today will remain in the atmosphere for decades and, in some cases, centuries, disrupting the climate for generations. It is up to us to turn the situation around.

Global Warming and Birds

Like many plants and animals, birds' life cycles and behavior are closely linked with the changing seasons. For neotropical migrant species, including many of the warblers, vireos, and other songbirds we enjoy watching on a summer field trip, changes in weather help signal when they should begin their long flights southward in the fall and back again in the spring.* Variables such as temperature and

* Neotropical migrants are birds that migrate long distances from wintering grounds in the "neotropics" (tropical regions of Mexico, Central and South America, and the Caribbean) to breeding grounds in North America (DeGraaf and Rappole 1995).

Black-throated
Blue Warbler

–U.S. Fish and
Wildlife Service

precipitation also affect the timing and availability of flowers, seeds, and other food sources for the birds when they reach their destinations. Moreover, birds that rely on very specific habitats for at least part of their life cycle, such as the endangered Golden-cheeked Warbler in Texas, could become extinct if their habitat disappears. For each of these reasons, many bird species are considered to be particularly vulnerable to global warming and associated climate change (Both and Visser 2001).

Global Warming May Already Be Affecting Some Bird Species

Studies indicate that the ranges of a number of bird species have been changing, consistent with the 20th century trend of rising average temperatures. One study of 35 North American warbler species, for example, has found that the range of occurrence of seven of the species (including Prothonotary Warbler, Blue-winged Warbler, Golden-winged Warbler, Black-throated Gray Warbler, Pine Warbler, Hooded Warbler, and Cape May Warbler) has shifted significantly farther north in the past 24 years, by an average of more than 65 miles. By comparison, none of the species in the study were found to be farther south (Price and Root, unpublished data). Similar trends have been discovered among some seabirds, such as the Sooty Shearwater, whose migration route has shifted toward cooler northwestern areas of the Pacific in response to rising sea temperatures off the coast of California (Oedekoven, et al., 2001).

There are also signs that recent climate trends are affecting birds' behavior. Studies in the United States and Europe have found that some songbirds are migrating earlier in spring months, corresponding with warmer temperatures. For example, research of migratory birds in North America shows that the arrival dates of 20 species were up to 21 days earlier in 1994 than in 1965, while just a few species were later (Root, unpublished data; Price and Root 2000). This includes long-distance migrants like the Rose-breasted Grosbeak, Black-throated Blue Warbler, and Barn Swallow. Similarly, North American Tree Swallows are now nesting up to nine days earlier than 30 years ago, corresponding with an increase in average spring temperatures (Dunn and Winkler 1999). Because this shift is occurring throughout the species' broad habitat range, scientists believe that the birds are responding to larger trends than just localized climate variations.

These changes may be occurring regardless of whether the birds' arrival is synchronized with the availability of food sources such as insects, flowers, and berries at their destination habitat. Global warming may cause migration and nesting to get out of step with food supplies. As a result, the "early birds" *may not* get the worm.

To determine how the summer distributions of birds might change in the future, Dr. Jeff Price of the American Bird Conservancy developed large-scale statistical models of the association between current bird distributions (based on North American Breeding Bird Survey data) and a number of climate variables (such as average seasonal temperature and precipitation and extreme values like the temperature in the hottest and coldest months). These climate variables serve as proxies for many factors possibly limiting a species' distribution, including physiology, habitat, and food availability, and are similar to those used in many bioclimatic studies.

He first checked the models to see how well the predicted species distributions matched maps of actual distributions. The results indicated that the summer distributions of many North American birds can actually be modeled quite well based on climate alone. He then used the Canadian Climate Center's General Circulation Model (CCC-GCM2) to project what average climate conditions may exist in North America if CO_2 concentrations in the atmosphere double from pre-industrial levels (sometime in the next 50 to 100 years). By applying the modeled future climate data to the original bird-climate models, he was able to project the possible future climatic ranges of many North American birds.

While model results cannot be used to look at fine points of how a given species' distribution might change, they can provide an impression of the possible direction and potential magnitude of change in suitable climate for the species. By examining these maps, Dr. Price has been able to develop lists of how the climatic ranges of species would be expected to change in particular states or regions or to estimate how the composition of groups of species, such as neotropical migrants, might change.

Scientists at the Rocky Mountain Biological Laboratory in Colorado, for example, have discovered that American Robins migrating to the region are arriving an average of two weeks earlier than they did 23 years ago. They attribute this shift to the likelihood that the birds are responding to warmer temperatures at the lower altitudes that typify their wintering grounds. The problem is, they are arriving at their higher-altitude summer breeding grounds only to find that there are still winter conditions there. There is now a 65-day gap between the date of the first robin sighting and the first date of bare ground at the snow measuring station, 18 days longer than in 1981. As a result, the birds must wait longer for the snow to melt before they can feed and may be at a greater risk of starvation (Inouye, et al., 2000).

In other cases, migratory birds are arriving *too late* for optimal food availability. The Pied Flycatcher, for example, spends its winters in tropical Africa and migrates north into Europe in the spring. Since 1980, the average spring temperature in parts of Europe has risen about 5.4 degrees Fahrenheit, and the peak insect populations (with which the birds' breeding coincided) have consequently shifted to earlier in the year (Both and Visser 2001). Their environment in Africa, however, has not changed significantly, and the birds are still migrating north about the same time as usual. When they reach their breeding site, they have to find their mates and lay their eggs quickly in order to capitalize on available food, which may already be past its peak. Consequently, the birds are raising fewer offspring.

The Potential Effects of Global Warming on the Distribution of Songbirds in the United States*

Bird communities, as we currently know them, may look quite different in the future if we do not begin to take meaningful action to reduce the greenhouse gas emissions responsible for global warming. As regional temperatures rise, the climatic ranges of a number of species in the Northern Hemisphere could shift north as they seek habitat, food availability, and other factors to which they are adapted. In turn, in the ranges they leave behind, the birds may be replaced by species from farther south.

When some species move to different ranges, they may face new prey, predators, and competitors, as well as different habitats. So-called "optimal" habitats for many species may no longer exist, at least in the short term (Price and Root 2001). This is particularly true for birds relying on specific plants for food or nesting. While most birds can respond quickly to a changing climate, the ranges of some plants may take

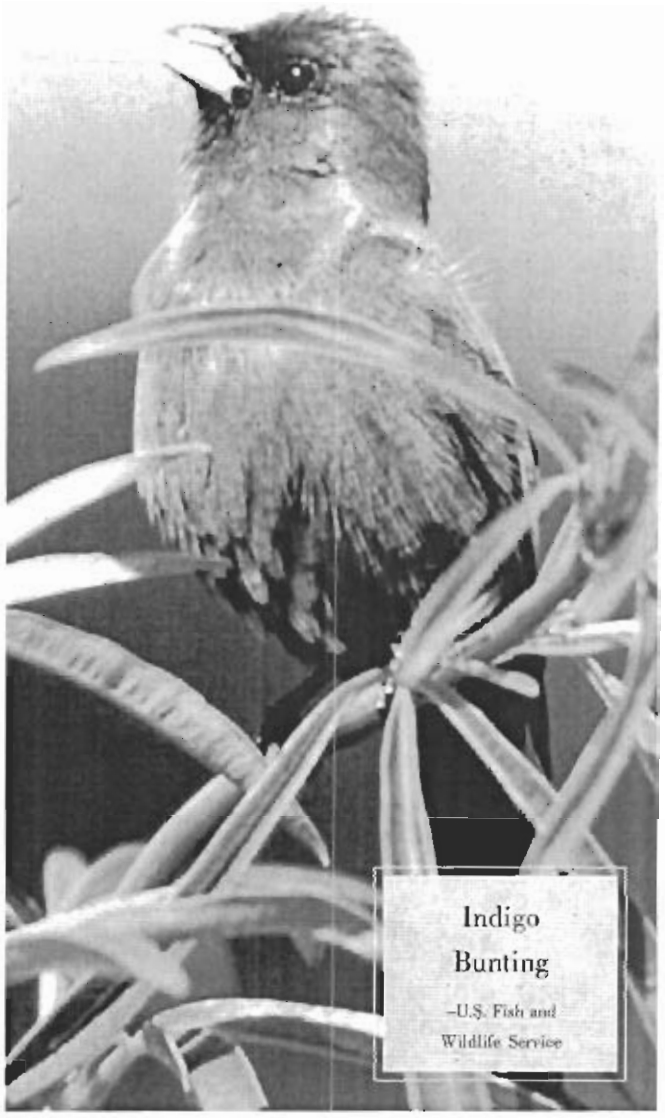
* Adapted from Price, J.T. and T.L. Root, March 20, 2001. "Climate Change and Neotropical Migrants." Presentation to the 66th Annual North American Wildlife and Natural Resources Conference, Washington, D.C.

centuries to move, if they move at all. Studies of past changes in climate suggest that many slow-maturing plants such as trees will have trouble responding to the future rate and magnitude of change that we could expect in the coming century, leading to changes in wildlife communities and possibly the extinction of some species (Webb 1992). Moreover, as the landscape becomes more and more fragmented due to development of roads, buildings, and farms, the ability of forest species to migrate is that much harder (Schneider 1997).

Global Warming Could Lead to a Net Decrease in Neotropical Migrant Species Present in the Contiguous United States

The following table shows how global warming might change the number of neotropical migrant species present in different regions of the country.[5] "Gross" changes depict the overall loss of species currently found in areas, while "net" changes depict species loss from an area offset by species moving into the area from an outside region. For example, the Great Lakes region could see a potential gross loss of 53 percent of the neotropical migrant species that are currently

[5] The empirical-statistical technique used in this analysis associates large-scale patterns of bird ranges with large-scale patterns of climate. It does not explicitly represent the physical and biological mechanisms that could lead to changes in birds' ranges. Therefore, these numbers should be viewed only as illustrative of the potential for very significant shifts with doubled CO_2 climate change scenarios (Root and Schneider 2002).



Indigo Bunting

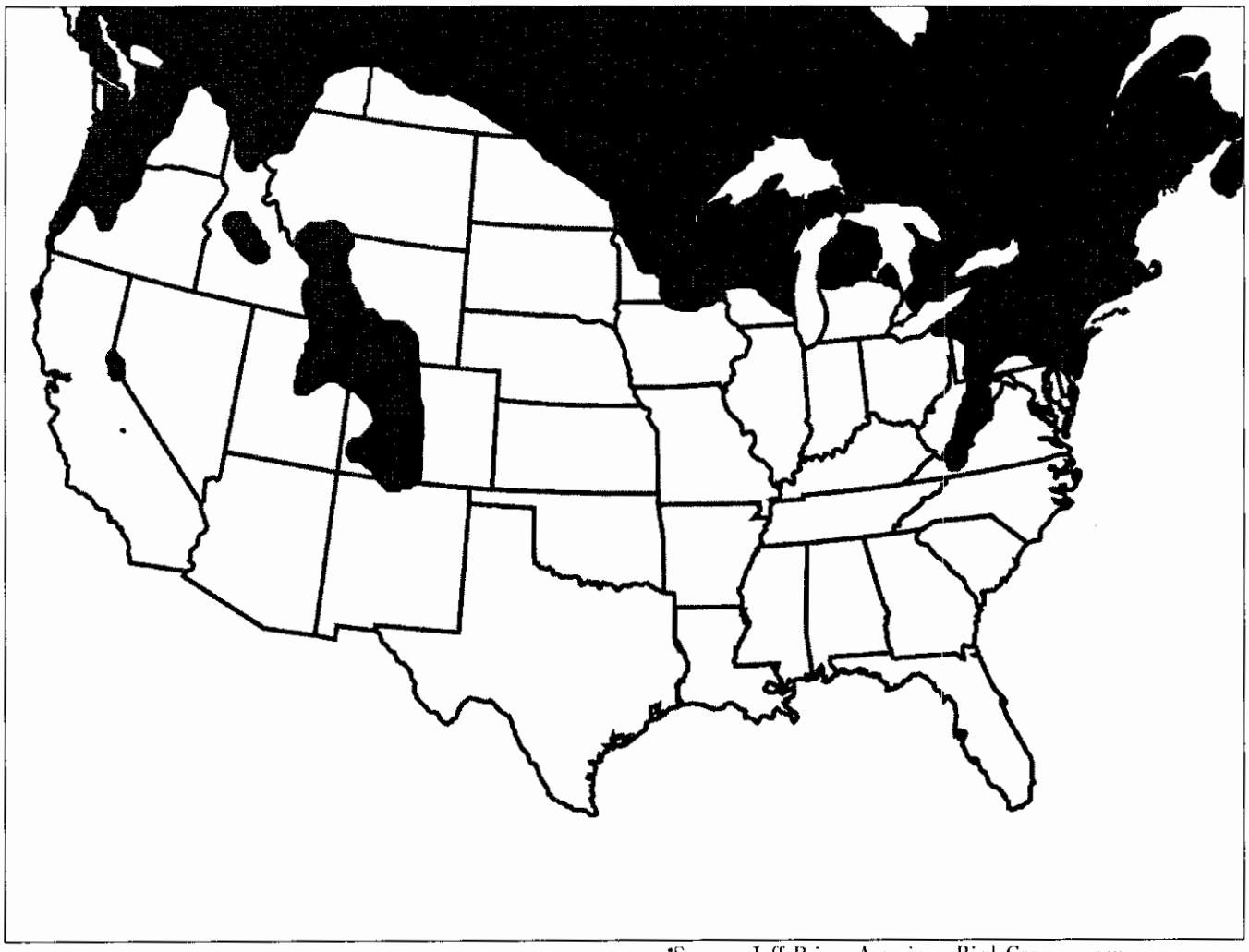
–U.S. Fish and Wildlife Service

Current Population Distribution of the American Goldfinch

American Goldfinch
–U.S. Fish and Wildlife Service

*Source: Jeff Price, American Bird Conservancy

Projected Population Distribution of the American Goldfinch (2 x CO_2)



*Source: Jeff Price, American Bird Conservancy

found in the region's states. These losses could be somewhat offset by birds colonizing from outside the region – Painted Buntings and Great-tailed Grackles replacing Bobolinks and Evening Grosbeaks in parts of southern Minnesota, for instance – so the net change might be 29 percent fewer neotropical species than are currently found there. On the whole, this analysis suggests that each region of the country could see a net decrease in the percent of neotropical migrant species present if global warming continues unabated.

Table: Projected Impacts of Global Warming on the Number of Neotropical Migrant Species Present in Regions of the United States – Percentage Changes (Source: Price and Root 2001)

NEOTROPICAL MIGRANTS		
California	-29	-6
Eastern Midwest	-57	-30
Great Lakes	-53	-29
Great Plains–Central	-44	-8
Great Plains–Northern	-44	-10
Great Plains–Southern	-32	-14
New England	-44	-15
Pacific Northwest	-32	-16
Rocky Mountains	-39	-10
Southeast	-37	-22
Southwest	-29	-4
Mid-Atlantic	-45	-23

Based on modeling results for the U.S. National Assessment Regionsusing the Canadian Climate Center's General Circulation Model (CCC-GCM2) climate data

The accompanying CD-ROM provides more detailed information on how the summer distributions of a number of bird species could change in each of the contiguous United States. These changes include species whose ranges in the particular state might expand, those that might contract, and those possibly eliminated (extirpated) from the state altogether. For example, New York could see a significant reduction in suitable climatic range for in Cape May Warblers, Bay-breasted Warblers, and other birds that are important predators of pest insects such as eastern spruce budworms, which can cause major damage to the state's forests. Arizona, Nevada, and New Mexico could lose Savannah Sparrows, Sage Thrashers, and other birds that help keep outbreaks of rangeland grasshoppers in check. And some states may even lose their State Bird. If global warming continues unabated, there may no longer be Baltimore Orioles in Baltimore (or anywhere else in Maryland). At the very least, the range of the species in Maryland may be greatly reduced.

How quickly these distributional changes might occur is uncertain. The rate of change will largely depend on whether a given species' distributional limits are more closely linked with climate, vegetation, or some other factor. While some

birds that are lost to one state may be found for the first time in another state, key vegetation and other habitat needs may not always be able to change fast enough or may be affected in other ways possibly undermining the birds' long-term survival. The rate of change will also likely be tied to the rate of change of the climate itself. If the climate changes relatively slowly, then species may be able to adapt to the new climate. With continued increases in greenhouse gas emissions, however, scientists project that climate change over the next century is likely to occur quickly, possibly too quickly for species to adapt adequately.

Additional Effects of Global Warming on Birds

In addition to altering species' ranges, global warming could have a direct effect on birds' habitat and behavior. As temperatures rise and precipitation levels change, the abundance of the birds' key food sources may shift. In some cases, the amount of available seeds, insects, or other foods may expand or decline in wintering habitat, affecting birds' health for migration and breeding. Similarly, plants may bloom or insects may hatch too early (or too late) for birds' spring arrival in their summer habitat, which could affect their reproduction success or disrupt important pollination.

Birds play an important role in communities by their aesthetic values and as sources of public pride. They provide a value to people through their very existence. Even non-birdwatchers may be thrilled to see a Bald Eagle soaring overhead, and many feel they would be deprived in some way if the birds disappeared. Climate models project that the climatic range of several State Birds could shrink or shift entirely outside of their official states.

Baltimore Oriole, Maryland's State Bird
–Dan Sudia Bird Photos

Brown Thrasher in Georgia

American Goldfinch in Iowa

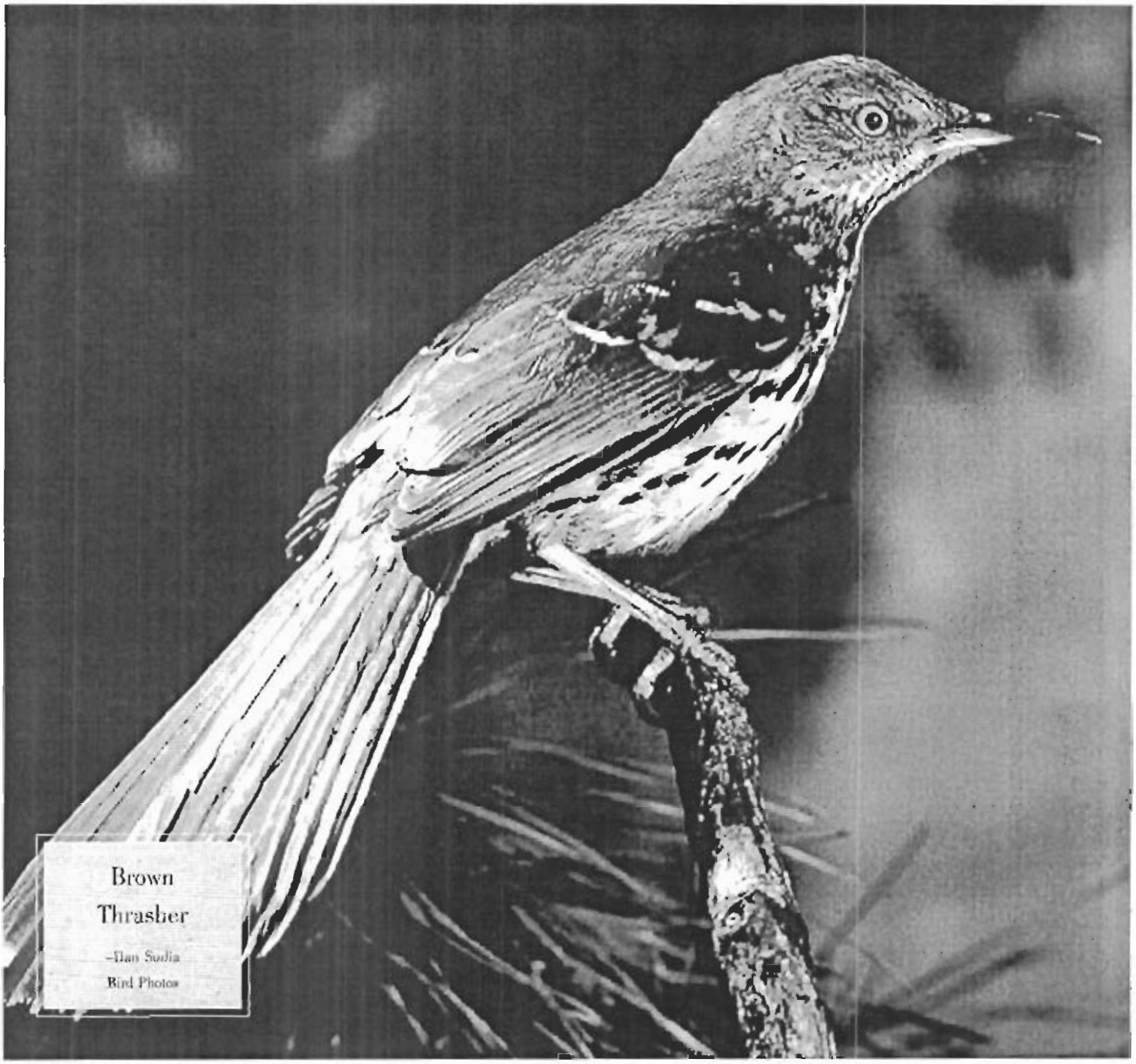
Baltimore Oriole in Maryland

Black-capped Chickadee in Massachusetts

Purple Finch in New Hampshire

American Goldfinch in Washington

California Quail in California


Brown
Thrasher
–Dan Sudia
Bird Photos

Sea-level rise could also inundate important coastal habitat in many places. Without meaningful action to reduce greenhouse gas emissions, climate scientists project that sea levels could rise by 3.5 inches to 2.9 feet in this century. This would have major implications for the more than 150 species of migratory waterfowl, shorebirds, and other birds that rely on coastal marshes in the mid-Atlantic region for nesting, feeding or roosting (Erwin 2001).

For songbirds and other wildlife whose populations are already limited by other human-induced problems, global warming could be the last straw. The endangered Southwestern Willow Flycatcher, which breeds in dense riparian areas along rivers, streams, or other wetlands in southern California, Arizona, New Mexico, and parts of Nevada, Utah, Colorado, and Texas, has seen its numbers plummet during the last 100 years due to the loss of these fragile habitats. If global warming and associated climate change contributes to hotter, drier conditions in the region, as some models project, the species could disappear (van Riper, C., III, et al., 1997). Two other endangered songbird species that face a comparable threat are the Golden-cheeked Warbler and the Black-capped Vireo in the hill country area of central Texas (U.S. EPA 1997).

Why Should We Care?

There are many reasons to be concerned about the plight of songbirds.

In economic terms alone, people spend billions of dollars every year on bird- and other wildlife-related recreation in the United States. According to a survey by the U.S. Fish and Wildlife Service, Americans spend more than $3.5 billion yearly on bird seed, houses, feeders, and baths, and an estimated 18 million adults take annual trips for the express purpose of watching birds (U.S. DOI 1997). On the whole, birdwatchers spend an average of $100 million in each state which in turn supports more than 200,000 jobs and generates more than $1 billion in state and federal tax revenues.

Birds also play an important role in nature, pollinating plants, dispersing seeds, and eating insects. Several species of warblers, for example, are thought to be responsible for eating up to 84 percent of spruce budworm larvae, possibly helping to control insect outbreaks in some areas (Crawford and Jennings 1989). In parts of the Great Lakes and Rocky Mountain regions, the loss of warblers and other insect predators could allow populations of spruce budworms, mountain pine beetles, and other pests to balloon, potentially damaging commercially and ecologically important forests.

Photo of Birders at Bosque del Apache
–supplied by Wild Birds Unlimited

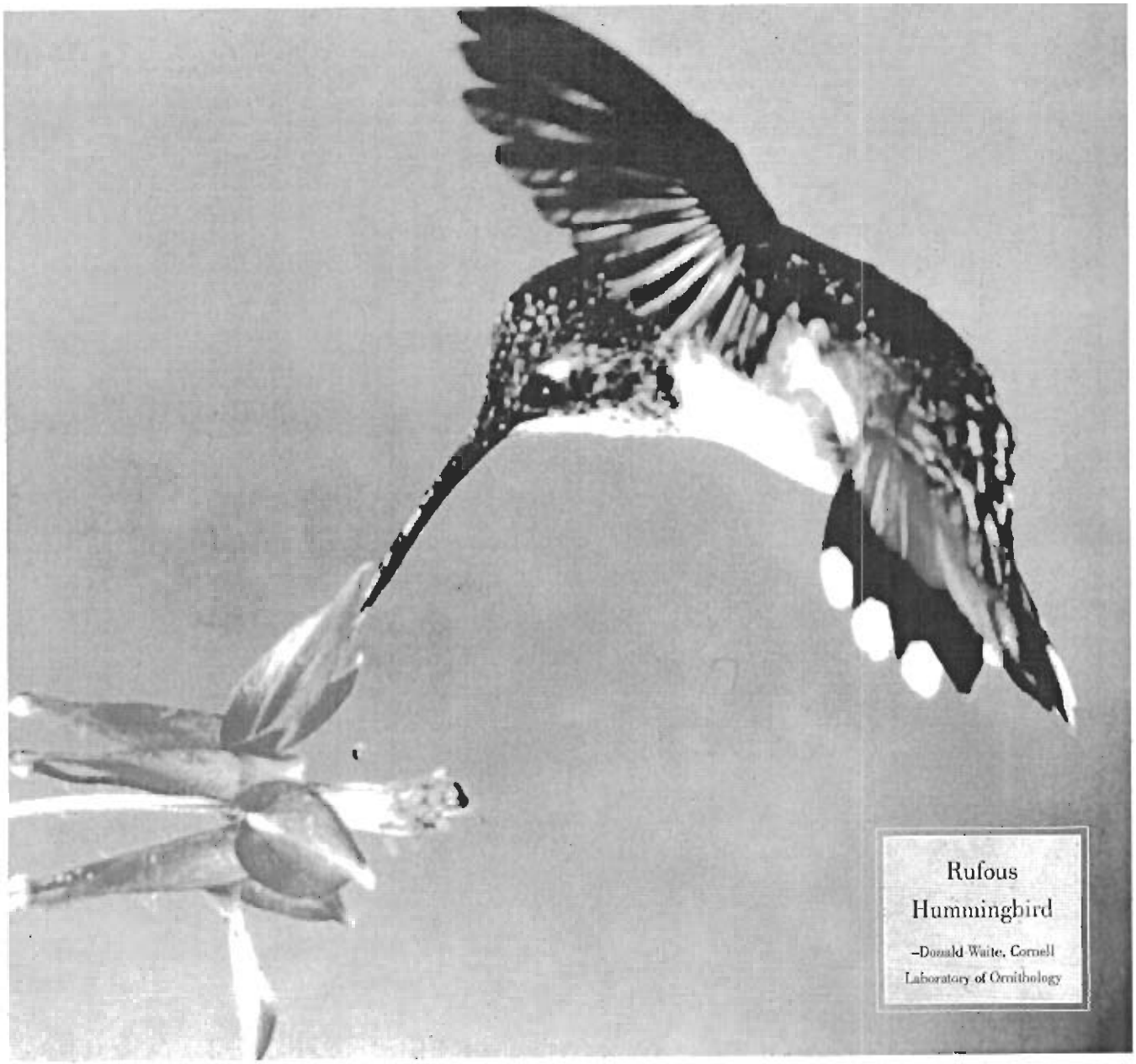
	State	Expenditures
1.	California	$2.4 billion
2.	New Jersey	$1.8 billion
3.	Florida	$1.7 billion
4.	Wisconsin	$1.6 billion
5.	Washington	$1.6 billion
6.	Michigan	$1.4 billion
7.	NewYork	$1.3 billion
8.	Texas	$1.2 billion
9.	Pennsylvania	$0.9 billion
10.	Georgia	$0.8 billion

In addition, some birds are critical to the reproduction of plants. The long-distance migrating Rufous Hummingbird, for example, is the primary pollinator for the wild blueberry in southeast Alaska. Since many other wildlife species in the region depend on the blueberry for food, the hummingbird helps benefit the entire ecosystem (Calder, 1993).

In summary, birds are important for natural systems – and they are important to people, too. The pure joy of awakening to the chorus of birds is enough to make us realize just how tragic it would be if even one species were to disappear because we ignored the serious *but solvable* problem of global warming. Like the proverbial "canary in the coal mine," birds' responses to global warming are signals of the wider threat to wildlife, people, and ecosystems if we do not act.

The Solution: Reduce Greenhouse Gas Emissions

By taking responsible action to cut emissions of CO_2 and other greenhouse gases, we can slow global warming and help reduce the threat it poses to people and wildlife alike. One of the most important things we must do is put technology and the ingenuity of American business to



Rufous Hummingbird

–Donald Waite, Cornell Laboratory of Ornithology

work for the environment by improving energy efficiency and promoting the development and use of renewable energy sources such as the wind and sun.

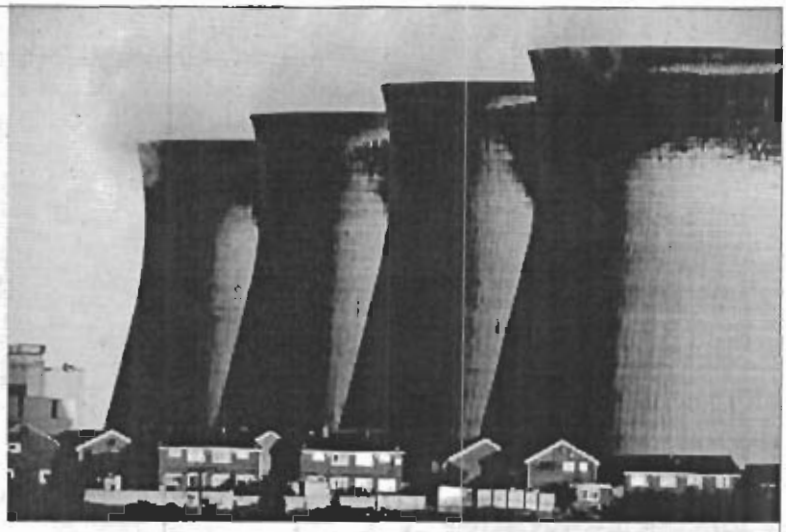
Improve Energy Efficiency

Increasing the energy efficiency of our homes, offices, motor vehicles, and factories is not only environmentally wise and technologically feasible; it also represents significant economic savings for households and businesses. Measures such as implementing stronger efficiency standards for air conditioners and appliances and improving energy efficiency in buildings over the next 20 years could eliminate the need

to build more than 600 electric power plants, preventing as much as 200 million tons of CO_2 emissions per year (Interlaboratory Working Group 2000). In addition, we can save more than one million barrels of oil and reduce at least 400 thousand tons of CO_2 emissions every day just by raising Corporate Average Fuel Economy (CAFE) standards for sport utility vehicles, pickups, and minivans from the current low of 20.7 miles per gallon (mpg) to 27.5 mpg. In a recent report, the National Academy of Sciences concluded that the technologies are readily available to all car companies to significantly improve fuel economy without sacrificing vehicle performance, affordability, and safety (NRC 2001b).

Promote Clean, Renewable Energy Sources

Abundant, clean, and reliable energy sources such as wind, biomass, and solar power also have tremendous potential to help us reduce our use of fossil fuels. Thanks in part to federal programs, the cost of renewable energy has fallen dramatically, and use of these technologies continues to grow. Over the past decade, worldwide sales of photovoltaic cells have increased more than six-fold – from 46 megawatts capacity in 1990 to 288 megawatts in 2000 (Brown 2001). The United States is currently the world's second-largest producer of solar cells, which supports thousands of jobs and positions the nation as a leader in the booming international market for solar energy [Energy Information Administration (EIA) 2001]. Although most of the solar technologies produced in the United States are currently exported for use in other countries, there are significant



Despite the enormous potential for cleaner energy, more than half of all electricity in the United States is still generated by burning coal, often by utilities using old, highly-polluting technology. According to the U.S. Environmental Protection Agency (U.S. EPA), Coal-fired power plants are responsible for more than 60 percent of the nation's sulfur dioxide and 23 percent of its nitrogen oxide emissions, which contribute to acid rain, smog, and nitrogen pollution that damage forest and aquatic ecosystems. These plants also produce more than 32 percent of mercury pollution, which ends up in our waters poisoning wildlife throughout the food web and imperiling human health. Moreover, coal-fired power plants emit close to 40 percent of the nation's CO_2, the gas chiefly responsible for global warming that threatens wildlife, ecosystems, and communities around the world.

The effects of these pollutants cut across all regions and endanger the entire range of wildlife, from the tiniest invertebrates to top predator mammals, in addition to threatening our health and economy. The good news is, technological advances in energy efficiency and exploitation of renewable energy sources could steadily lessen our dependence on coal (and other fossil fuels). With the right policy strategy, a sustainable energy future that is environmentally sound, affordable, and reliable could rapidly become a reality. To learn more about what you can do to help reduce the toll from coal, visit ***www.nwf.org/climate/tfc_index.html.***

The National Wildlife Federation's Backyard Wildlife Habitat program can help you save a place for birds and other wildlife right in you own backyard while opening your eyes and heart to the natural world. Backyard Wildlife Habitat landscapes nurture wildlife and, at the same time, benefit the overall quality of the environment by improving air, water, and soil throughout the community.

opportunities to expand solar energy here at home. The Sacramento Municipal Utility District (SMUD), for example, is planning to add 30 to 40 megawatts of solar energy to its existing 10 megawatts, which will be enough solar power to serve over 8,000 homes (SMUD Aug/Sep 2001).

Finally, in addition to reducing greenhouse gas emissions, we must begin to consider the potential effects of global warming as we develop our long-term conservation plans (Root and Schneider 2002). Current protected areas may no longer be sufficient in protecting wildlife whose ranges have shifted. Moreover, the ability for species to migrate in search of more favorable habitat is hindered by human development outside of park borders. For these and other reasons, we need to consider a broader, more long-term approach to conservation that takes into consideration the general threat of global warming, and provides the greatest amount of flexibility to expand protection plans as we learn more about the potential impacts on particular species or ecosystems. Now is the time, for example, to develop buffer zones in coastal areas and around parks as continuing pressures for development will likely make it much more difficult – if not impossible – to protect such areas in the future (Glick, et al., 2001). And we can reap multiple benefits by protecting the nation's and the world's forests. Not only do healthy forests provide important habitat for birds and other wildlife, they help maintain nature's ability to regulate carbon.

5 Things You Can Do Starting Today

1) Change or clean your furnace and air conditioner filters regularly to keep heating and cooling systems running efficiently.
2) Recycle aluminum cans, glass bottles, plastic, cardboard, and newspapers, which helps reduce the energy needed to make new products.
3) Regularly check your car's tire pressure – poorly inflated tires waste gas and cause extra pollution. Better yet, carpool or take mass transportation whenever possible.
4) Set your water heater to a lower setting or call a service person to adjust it for you.
5) Contact your representatives in Congress and encourage government to enact policies that reduce greenhouse gas emissions and support clean, renewable energy sources and energy conservation.

5 Ways to Make Your Purchases Work to Protect the Environment

1) When you need to replace the light bulbs in your home, buy compact fluorescent bulbs, which reduce energy use by up to 75%.
2) When shopping for home appliances and electronics, look for the "Energy Star" label.
3) When you purchase a car, buy the most fuel-efficient model that meets your needs. This will reduce your gas consumption, cut CO_2 pollution, and save you money at the gas pump.
4) Install a clock thermostat to save heating and cooling energy at night and when no one is home.
5) If available, buy "Green Power" that comes from non-polluting sources of electricity such as solar cells and windmills.

For more information on these and other steps you can take, go to ***www.nwf.org/climate***.

Each of us can make a difference. Whether we improve the energy efficiency of our homes, or promote strong public policies to curb greenhouse gas emissions, or even develop a Backyard Wildlife Habitat™, we will help ensure that our natural world -- and the birds that call it home – will endure for generations to come.

To learn more about global warming and its effects on birds and what you can do to make a difference, go to *www.nwf.org/climate* or *www.abcbirds.org*. You can also see how global warming could affect songbird distributions in your home state by viewing the enclosed CD-ROM.

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American Bird Conservancy (ABC) is a 501(c)3 not-for-profit organization whose mission is to conserve wild birds and their habitats throughout the Americas. The fundamental role of ABC is to build coalitions of conservation groups, scientists, and members of the public to tackle key bird priorities using the best resources available.

The mission of the **National Wildlife Federation (NWF)** is to educate, inspire and assist individuals and organizations of diverse cultures to conserve wildlife and other natural resources and to protect the Earth's environment in order to achieve a peaceful, equitable and sustainable future.

Embargoed for Release:
Saturday, Feb. 19, 2005 at 8 a.m. ET

Contact: Steve_Bradt@harvard.edu
(617) 496-8070

Warming World Could Worsen Pollution in Northeast, Midwest

Harvard researcher to report at AAAS meeting on projected decline in cleansing summer winds

CAMBRIDGE, Mass. – While science's conventional wisdom holds that pollution feeds global warming, new research suggests that the reverse could also occur: A warming globe could stifle summer's cleansing winds over the Northeast and Midwest over the next 50 years, significantly worsening air pollution in these regions.

Loretta J. Mickley, a research associate at Harvard University's Division of Engineering and Applied Sciences, will report on these findings Saturday, Feb. 19, at the annual meeting of the American Association for the Advancement of Science in Washington, D.C. Her work is based on modeling of the impact of increasing greenhouse gas concentrations on pollution events across the United States through 2050.

Using this model, Mickley and colleagues found that the frequency of cold fronts bringing cool, clear air out of Canada during summer months declined about 20 percent. These cold fronts, Mickley said, are responsible for breaking up hot, stagnant air that builds up regularly in summer, generating high levels of ground-level ozone pollution.

"The air just cooks," Mickley says. "The pollution accumulates, accumulates, accumulates, until a cold front comes in and the winds sweep it away."

Ozone is beneficial when found high in the atmosphere because it absorbs cancer-causing ultraviolet radiation. Near the ground, however, high concentrations are considered a pollutant, irritating sensitive tissues, particularly lung tissues.

"If this model is correct, global warming would cause an increase in difficult days for those affected by ozone pollution, such as people suffering with respiratory illnesses like asthma and those doing physical labor or exercising outdoors," Mickley says.

Mickley and her colleagues used a complex computer model developed by the Goddard Institute for Space Studies in New York, with further changes devised by her

team at Harvard. It takes known elements such as the sun's luminosity, the earth's topography, the distribution of the oceans, the rate of rotation of the earth, the pull of gravity and the tilt of the earth's axis, and figures in variables provided by researchers.

Mickley gradually increased levels of greenhouse gases at rates projected by the Intergovernmental Panel on Climate Change, a group charged by the United Nations to study future climate variation. Her model looked at the effect the changing climate would have on the concentrations of two pollutants: black carbon particles – essentially soot – and carbon monoxide, which could also indicate ozone levels. When the model first indicated that future climate change would lead to higher pollution in the Northeast and Midwest, Mickley and her colleagues were a bit surprised.

"The answer lies in one of the basic forces that drive the Earth's weather: the temperature difference between the hot equator and the cold poles," Mickley says.

Between those extremes, the atmosphere acts as a heat distribution system, moving warmth from the equator toward the poles. Over mid-latitudes, low-pressure systems and accompanying cold fronts are one way for heat to be redistributed. These systems carry warm air poleward ahead of fronts and draw down cooler air behind fronts.

In the future, that process could slow down. As the globe warms, the poles are expected to warm more quickly than the equator, decreasing the temperature difference between the poles and the equator. The atmosphere would then have less heat to redistribute and would generate fewer low-pressure systems.

With fewer cold fronts sweeping south to break up hot stagnant air over cities, the air would sit in place, gathering pollutants. Mickley's model shows the length of these pollution episodes would increase significantly, even doubling in some locations.

Mickley's collaborators include Daniel J. Jacob and B. D. Field at Harvard and D. Rind of the Goddard Institute for Space Studies. Their work was funded by a Science to Achieve Results (STAR) grant from the Environmental Protection Agency.

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NOTE: Mickley will present her work at a symposium titled "Climate Change Is in the Air: Studies of Global Warming from Satellites," scheduled for Saturday, Feb. 19 at 8 a.m. in Maryland Suite C of the Marriott Wardman Park Hotel in Washington.

Effects of future climate change on regional air pollution episodes in the United States

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Division of Engineering and Applied Science, Harvard University, Cambridge, Massachusetts, USA

D. Rind
Goddard Institute for Space Studies, New York, New York, USA

Received 6 August 2004; revised 1 November 2004; accepted 22 November 2004; published 28 December 2004.

[1] We examine the impact of future climate change on regional air pollution meteorology in the United States by conducting a transient climate change (1950–2052) simulation in a general circulation model (GCM) of the Goddard Institute of Space Studies (GISS). We include in the GCM two tracers of anthropogenic pollution, combustion carbon monoxide (COt) and black carbon (BCt). Sources of both tracers and the loss frequency of COt are held constant in time, while wet deposition of BCt responds to the changing climate. Results show that the severity and duration of summertime regional pollution episodes in the midwestern and northeastern United States increase significantly relative to present. Pollutant concentrations during these episodes increase by 5–10% and the mean episode duration increases from 2 to 3–4 days. These increases appear to be driven by a decline in the frequency of mid-latitude cyclones tracking across southern Canada. The cold fronts associated with these cyclones are known to provide the main mechanism for ventilation of the midwestern and northeastern United States. Mid-latitude cyclone frequency is expected to decrease in a warmer climate; such a decrease is already apparent in long-term observations. Mixing depths over the midwest and northeast increase by 100–240 m in our future-climate simulation, not enough to compensate for the increased stagnation resulting from reduced cyclone frequency. *INDEX TERMS:* 0345 Atmospheric Composition and Structure: Pollution—urban and regional (0305); 0368 Atmospheric Composition and Structure: Troposphere—constituent transport and chemistry; 1610 Global Change: Atmosphere (0315, 0325). **Citation:** Mickley, L. J., D. J. Jacob, B. D. Field, and D. Rind (2004), Effects of future climate change on regional air pollution episodes in the United States, *Geophys. Res. Lett.*, *31*, L24103, doi:10.1029/2004GL021216.

1. Introduction

[2] Long-term projections for surface air quality in the United States must account not only for future changes in emissions but also for changes in climate. The frequency of pollution episodes varies considerably from year to year depending on weather [e.g., *Vukovich*, 1995; *Lin et al.*, 2001], pointing to the potential importance of climate change. Several model studies have examined the sensitivity of ozone and aerosols to changes in temperature and humidity [*Bufalini et al.*, 1989; *Sillman and Samson*, 1995; *Aw and Kleeman*, 2003]. More important may be the sensitivity to changes in mixing depths, frequency of stagnation episodes, and synoptic-scale circulations [e.g., *Logan*, 1989; *Vukovich and Sherwell*, 2002]. We explore these effects here with a general circulation model (GCM) transient simulation of 2000–2050 climate change.

[3] We focus on the eastern and midwestern United States where pollution episodes tend to extend over regional scales greater than 500,000 km^2 [*Logan*, 1989; *Eder et al.*, 1993], in contrast to the more mountainous west where they tend to be local and affected by topography [e.g., *Pun and Seigneur*, 1999; *Winner and Cass*, 1999]. Regional pollution episodes in the east and midwest are associated with slowly moving high pressure systems with restricted boundary layer ventilation [e.g., *Schichtel and Husar*, 2001; *Hogrefe et al.*, 2004]. The episodes are terminated by mid-latitude cyclones traveling eastward across southern Canada [*Dickerson et al.*, 1995; *Merrill and Moody*, 1996; *Stohl*, 2001]. The cold fronts associated with these cyclones sweep across the northern United States, lifting polluted air to the free troposphere in warm conveyor belts ahead of the front and replacing it with clean high-latitude air behind the front [*Cooper et al.*, 2001]. The fronts generally do not reach into the southeastern United States, and ventilation there is mostly driven by deep convection and inflow from the Gulf of Mexico (Q. Li et al., Outflow pathways for North American pollution in summer: a global 3-D model analysis of MODIS and MOPITT observations, submitted to *Journal of Geophysical Research*, 2004, hereinafter referred to as Li et al., submitted manuscript, 2004).

[4] Only a few GCM studies have examined the effect of climate change on pollution transport, and then only in a very general sense. *Rind et al.* [2001] found that increased convection in a doubled-CO_2 atmosphere led to improved ventilation of the continental boundary layer. *Holzer and Boer* [2001] found that weaker winds in a warmer climate led to higher concentrations in pollution plumes. We present here a more specific analysis of the effect of future climate change on the frequency and severity of pollution episodes in the United States. For this purpose, we use a GCM transient model simulation for 2000–2050 including two simple tracers of anthropogenic pollution, combustion carbon monoxide (CO) and black carbon aerosol (BC). Emissions for both tracers are held constant over the simulation, so that any trends in concentration are driven solely by climate change.

2. Methods

[5] We implemented the CO and BC tracers into the Goddard Institute for Space Studies (GISS) GCM 2' [*Rind*

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0094-8276/04/2004GL021216$05.00

and Lerner, 1996; *Rind et al.*, 1999]. The GCM version used here has a "qflux ocean" [*Hansen et al.*, 1988] and a horizontal resolution of 4° latitude and 5° longitude, with nine vertical layers in a sigma coordinate system extending from the surface to 10 hPa. The three lowest layers are centered at about 260 m, 860 m, and 1900 m for an air column based at sea level. In the qflux model, monthly mean ocean heat transport fluxes are first calculated to generate observed, present-day sea surface temperatures. In subsequent simulations, sea surface temperatures and ocean ice respond to changes in climate, while the ocean heat transport fluxes are held fixed.

[6] The CO and BC tracers are denoted here as "COt" and "BCt" to emphasize their generic nature. The source of COt in the model is present-day fossil fuel CO emissions [*Wang et al.*, 1998], and COt loss is by reaction with OH as computed from present-day, monthly mean OH fields [*Mickley et al.*, 2004]. We ignore any perturbations to OH due to climate change [*Johnson et al.*, 1999; *Shindell et al.*, 2001] in order to isolate the effect of transport. The BCt source is present-day global BC emissions from *Park et al.* [2003]. BCt is assumed to be scavenged efficiently by wet deposition, which in our model follows the scheme of *Koch et al.* [1999].

[7] The transient climate simulation was performed from 1950 to 2052 with concentrations of the well-mixed greenhouse gases – CO_2, CH_4, N_2O, and halocarbons – updated yearly. For 1950–2000 we used observations [*Hansen et al.*, 2002]. For 2000–2052 we used the A1B scenario from the Intergovernmental Panel on Climate Change (IPCC), with CO_2 as implemented in the Bern-CC model [*Houghton et al.*, 2001]. For future halocarbons we followed *Hansen et al.* [2002]. We fixed ozone and aerosol concentrations in the radiative scheme at present-day climatological values.

[8] Results for the years 1995–2052 were analyzed. The long spin-up time allows the calculated sea surface temperatures to adjust. From 1995 to 2052 we calculate a globally averaged surface temperature increase of 1.9°C, corresponding to a forcing of 2.1 W m^{-2}. Precipitation rates over the southeastern United States decrease by as much as 20% in summer, but increase by 20% in winter due to increased southerly transport of moist tropical air. Elsewhere in the United States, precipitation rates do not change significantly in the future scenario. Analysis of model results focuses on daily mean concentrations. Because the vertical resolution of the boundary layer is coarse, simulated surface air concentrations show little diurnal variation and are most representative of daytime conditions, when the mixed layer is deep [*Jacob et al.*, 1993a].

3. Results

[9] For the present-day period 1995–2002, surface COt concentrations over the United States range from 50–150 ppb in summer to 150–200 ppb in winter. These are lower than observed CO concentrations since we have not included biomass burning or chemical production as sources of COt. A more complete tropospheric chemistry simulation conducted previously with the same GCM for present-day conditions showed a good representation of CO concentrations [*Mickley et al.*, 1999]. For BCt in source regions of the United States, simulated mean concentrations in surface air range from about 0.6–1.1 μg m^{-3} in winter to 0.4–0.7 μg m^{-3} in summer, roughly consistent with observations for BC [*Park et al.*, 2003].

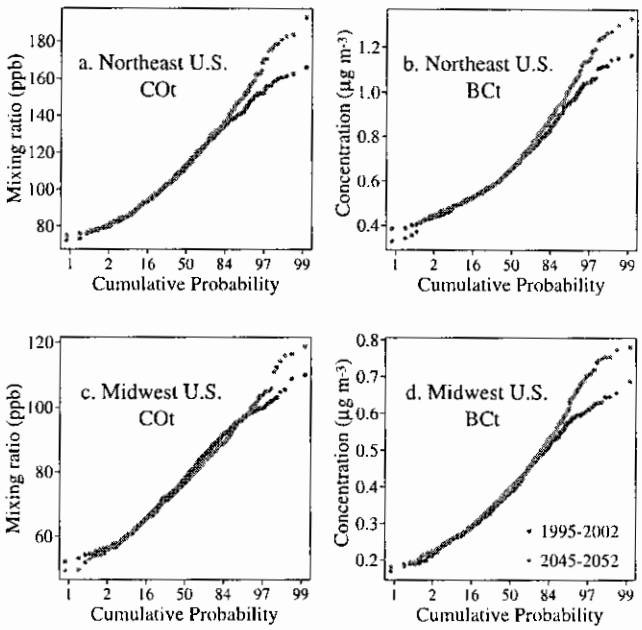

Figure 1. Cumulative frequency distributions of simulated daytime concentrations of combustion carbon monoxide (COt) and black carbon (BCt) averaged over the northeastern and midwestern United States in July and August. Each point represents the spatial average for a particular day. Results are shown for the present-day climate (1995–2002, in green), and the future A1B climate (2045–2052, in red). To isolate the effect of climate change, sources of COt and BCt and the sink of COt are the same for the present-day and future simulations.

[10] We find that seasonal mean surface concentrations of COt and BCt for the years 2045–2052 show in general no significant change relative to present-day. Over the southeastern United States in winter, the increase in precipitation reduces seasonal mean BCt by 5%. A better indicator of the response of air quality to a changing climate is the change in the intensity and duration of high pollution episodes. We examined the cumulative frequency distributions of daily mean surface concentrations of COt and BCt averaged over 6 regions of the United States: (1) the northeast, which includes New England, the mid-Atlantic states, Ohio, West Virginia, Virginia, and eastern Kentucky; (2) the southeast, which extends from eastern Texas to the Atlantic coast; (3) the midwest, which extends from eastern Colorado to Indiana and as far south as Missouri; (4) the southwest; (5) the northwest; and (6) California. The regions range in size from 16 gridboxes (the midwest) to 3 (California).

[11] The largest changes in the frequency distributions for surface COt and BCt concentrations occur over the northeast and midwest in summer, defined here as July–August. In Figure 1, we show the summertime distributions over these two regions for 2045–2052 and 1995–2002. Median and background concentrations do not change significantly. Concentrations at the high end of the distributions, representing pollution episodes, are greater by 5–10% in the future climate. The change is statistically significant ($p < 0.05$) above the 84th percentile for COt and BCt in the

northeast and for BCt in the midwest, representing a collection of 79 days for each 8-year period. The change is also significant above the 97.5th percentile for COt in the midwest (12 days for each 8-year period). Our results indicate an increase in the severity of summertime pollution episodes in these two regions by 2050. Elsewhere in the United States in summer and for most regions during other seasons, we do not detect significant differences in the frequency distributions of concentrations between present-day and 2050 climates.

[12] Surface concentrations in the northeast in the model correlate highly with those of the midwest with a 1–2 day time lag, consistent with observations [*Logan*, 1989; *Moody et al.*, 1998]. The correlation implies that the same synoptic-scale transport mechanisms govern pollution episodes in both regions. Daily mean maximum mixing depths, which average 1.1 km (northeast) and 1.3 km (midwest) in the present-day, increase significantly in the future by 100–240 m ($p < 0.05$), consistent with higher surface temperatures and greater vertical mixing [*Rind et al.*, 2001]. The change in future mixing depths is of the wrong sign to explain the increase in severity of future pollution events.

[13] Time series of BCt and COt surface concentrations over the northeast and midwest in summer show greater autocorrelation in the future than for present-day. We counted the number of consecutive days with regional concentrations above the 84th percentile as representative of pollution episodes. Over the midwest we found an increase of episode duration from 2.3 days to 3.0 days for COt and from 2.4 days to 4.6 days for BCt. In the northeast, COt pollution episodes lengthen from 2 to 2.5 days, but the change for BCt episodes is negligible.

[14] Termination of pollution episodes in the midwest and northeast is driven by cyclones crossing southern Canada and the associated cold fronts, which sweep away pollution [*Cooper et al.*, 2001]. To calculate trends in surface cyclone frequency in the model, we counted the number of times each summer when the mean sea level pressure over Quebec dropped for two consecutive days to below the mean for that summer and then rose on the third day. Using the same method, we also counted the number of surface cold air surges into the midwestern United States from Canada. We found that the average number of cyclones crossing Quebec decreased slightly in the future simulation relative to the present, from 7.5 cyclones per summer to 6.8. The number of cold surges into the midwest decreased 20%, from 6.2 events per summer to 5. The uncertainty in these trends is large; to calculate statistically significant trends would require more years of daily model output. In observations, cold fronts ventilate the northeast every 4–5 days in July–August (Li et al., submitted manuscript, 2004), for a total of about 14 events during those two months. Our method underestimates the number of cyclones and cold surges, which may reflect our definition of these events or the coarse resolution of the model. However, as discussed below, decreasing cyclone frequency in the future climate appears to be a robust result.

4. Discussion

[15] Our results suggest that a warming climate could increase the severity of summertime pollution episodes in the northeastern and midwestern United States. The increase in severity appears to be caused by a decrease in the frequency of surface cyclones tracking across southern Canada. Our model trend in cyclone frequency is consistent with observed long-term trends over North America [*Zishka and Smith*, 1980] and more generally at northern mid-latitudes [*Agee*, 1991; *Key and Chan*, 1999; *McCabe et al.*, 2001]. For example, *Zishka and Smith* [1980] found an 8% decline per decade in the number of July surface cyclones over North America for the period 1950–1977.

[16] Previous GCM studies with increasing greenhouse gases have also calculated a decline in mid-latitude cyclone frequency. Probable causes for this trend include (1) a decrease in the extratropical meridional temperature gradient from the surface through the mid-troposphere, which reduces baroclinicity [*Carnell and Senior*, 1998; *Geng and Sugi*, 2003], and (2) an increase in the magnitude and efficiency of the meridional eddy transport of latent heat, which reduces the number of cyclones required to maintain the meridional temperature gradient [*Zhang and Wang*, 1997]. Consistent with these studies, we find that the meridional temperature gradient in the lower troposphere between 30N and 55N over eastern North America weakens in summer by about 1°C. Over mid-latitudes at 600–800 hPa, the northward, zonally averaged eddy transport of latent heat increases in summer by 5–10%.

[17] We conclude that reduced cyclone frequency in a future warmer climate will lead to an increase in the severity of summertime pollution episodes in the northeastern and midwestern United States. Although the GCM used in our analysis is relatively coarse, the decrease in cyclone frequency and implication for air quality appears to be a robust result. It is well established that cyclones play a critical role in ventilating pollution from these regions. There is also compelling evidence that the frequency of these cyclones has been decreasing over the past decades. This decrease is likely to continue in the future due to increases in greenhouse gases. Quantitative analysis of the implications for future air quality will require regional climate models with detailed chemistry, but the computational demands of such models are formidable. Statistical analysis of observed correlations between pollutant concentrations and meteorological parameters may provide a useful tool to predict pollution trends in GCM simulations. For example, the observed correlation of ozone with temperature in the eastern United States is known to reflect the influences of chemistry, biogenic emissions, and stagnation [*Jacob et al.*, 1993b]. GCM simulations of future temperature change could thus be used to predict future surface ozone changes.

[18] **Acknowledgments.** This work was funded by the U.S. Environmental Pollution Agency, IAG DW-4793948201 and STAR R830959 grants. It contributes to the Climate Impacts on Regional Air Quality project in the USEPA National Exposure Research Laboratory. We thank Dylan Jones for useful discussions.

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D. Rind, Goddard Institute for Space Studies, New York, NY 10025, USA.

Adams, Karen K NAE

From: Melissa Andrews [squid_mja@hotmail.com]
Sent: Thursday, February 24, 2005 7:40 PM
To: Energy, Wind NAE
Subject: wind

004419

Dear Karen Kirk-Adams,

I am in favor (or against) the Cape Wind project because □.. It is a environmentally sensative solution to this countries energy crisis, global warming, and a strong and beautiful message to others.

Thank You, Melissa Andrews Denver, CO

Adams, Karen K NAE

From: Rolf Kluever [rkkluever@aol.com]
Sent: Thursday, February 24, 2005 7:05 PM
To: Energy, Wind NAE
Subject: wind park project on Horseshoe Shoal

Dear Ms. Karen Kirk-Adams:

004420

Hello...I am a retired engineer with 25 years of energy-related experience...I was responsible fo energy conservation in a Fortune 500 company...I introduced to my company cogeneration replacing boiler plants, high efficiency production processes, lighting, HVAC, etc...

I make my home now on the Cape...The Cape Wind project would be an almost poetic return of wind power to the Cape, where it had served agrculture and industry in the past...it would become a beacon to the rest of the country to strive for environmentally friendly energy-independency...

The technology exists...other countries are way ahead of us in wind power application...there has to be the political will among our leaders to further wind power...an environmentally friendly source of power...I believe that strong grass-roots support exists for wind power, but is stifled by the selfishly motivated lobbying actions of the more influential citizens...energy-independence is a matter of patriotism, and should not be denied to those of good will...Rolf Kluever, PE

Sincerely,

Rolf Kluever
447 Currier Rd.
East Falmouth, MA 02536

cc:
Capewind

Adams, Karen K NAE

From: David Damroth [info@capewind.org]
Sent: Thursday, February 24, 2005 7:18 PM
To: Energy, Wind NAE
Subject: wind park project on Horseshoe Shoal

Dear Ms. Karen Kirk-Adams:

004421

Please do everything you can to support the Capewind windfarm.
It is important to the cape region and future of the country.

Sincerely,

David Damroth
27 Oyster Lane
Chilmark, MA 02535-0295

cc:
Capewind

Adams, Karen K NAE

From: mail [mail@rivale.com]
Sent: Thursday, February 24, 2005 7:18 PM
To: Energy, Wind NAE
Cc: comments@saveoursound.org
Subject: Comments - Cape Wind

004422

Karen Kirk-Adams:

I am opposed to this project. However, in the event it is approved please Require that the developer, it's successors and/or assigns post a PAYMENT AND PERFORMANCE BOND to fund the dismantling of the project if it fails.

Thank you.

Courtland McDonald
PO Box 71
Marion, MA 02738

508 748 2265

Adams, Karen K NAE

From: George Kovatch [kovatch@comcast.net]
Sent: Thursday, February 24, 2005 7:21 PM
To: Energy, Wind NAE
Cc: Kovatch, George
Subject: Comments and Questions Re: Nantucket Sound Wind Farm

004423

To: Corps of Engineers
RE: Nantucket Sound Wind Farm Proposal

I submit for your consideration and incorporation in your analysis of the proposed wind farm project the following:

1) What and who will be responsible, and to what extent, should the 130 proposed wind turbines not perform up to expectations. If they had to be taken down and replaced or repaired as in the Horns Rev project in Denmark who would be required to pay for repairs, replacement of parts, maintemance and transport of materials from off-shore to on-shore and back? Recent reports highlight the significant problems encountered at Horns Rev which required movement of equipment to shore to retrofit 81 of the 2 megawatt turbines at considerable expense. It would be informative to include in your assessment what the logistics would entail and what the maintenance costs would be for labor and materials if the 130 turbines were to run into similar mechanical and electrical problems. Who would pay for all repairs and operational expenses?

2) The recent blizzard of 2005 highlights the many difficulties caused by ice formation and snow buildup on buildings, equipment, bridges, etc. even those that rotate such as wind turbines. The Cape Cod Canal Railroad Bridge is designed to offset snow and ice buildup and actively compensates with large counterweights and careful regulation of the bridge in severe weather conditions. In Western Massachusetts wind farms receive considerable care in allocating safe spacing distances between towers, roads, residences etc. to protect people and property from flying chunks of ice that come off the rotating turbines. What provisions are being planned for Nantucket Sound? What navigation hazards and warnings would be needed for ferry boat operation, and other at sea operations? In your preliminary assessment this problem is understated and minimized claiming it as no issue. Has an adequate assessment been made that considers operations at sea arouind the 130 towers?

3) Is the analysis well enough developed to predict what happens in the electrical network when wind turbines fluctuate from their peak highs to lows under changing wind conditions? What are the effects on the network of intermittent operation on the rest of the grid? Does it upset the balance and cause more disruptions and blackout periods? Our recent blizzard on-Cape reminds us of the effects of power shutdowns. What would happen under integrated intermittent operation of windmills in the network? Could there be more disruptions? Has the assessment included sufficient data on where the power will come from if an imbalance arises? What provisions are incorporated in the system to assure continuous flow of power to consumers?

4) Little is said about noise generation. Is that because little is known about the noise generated by individual turbines and groups of turbines at off-shore locations? Comparisons of noise are often made to screeching jets overhead or heavy street traffic or other noise generators. What are the expected noise levels from individual towers, groups of towers, and from the whole site under various wind and seasonal conditions?

5) What is your understanding of the level and kind of underwater noise emissions that will be generated during the construction phase? There will be many large pile drivers pounding in the large base structure for each tower and distribution facility. Has this been included in your assessment? What are the effects of these underwater noise emissions and vibrations on marine life and their migration patterns? Is it significant enough to warrant further study? Noise considerations both above the surface of the water and underwater warrant more consideration.

6) More should be included in the assessment regarding the items listed above. Also more should be made known about what to expect during the construction, operation, maintenance and any upgardes or expansions to the project.

Thank you for your consideration.
George Kovatch
Cummaquid, MA
Feb. 24, 2005

George Kovatch
P.O. Box 562
Cummaquid, MA 02637
e-mail: kovatch@comcast.net
++++++++++++++++++++++++++++++

Adams, Karen K NAE

From: George Kovatch [kovatch@comcast.net]
Sent: Thursday, February 24, 2005 7:43 PM
To: Energy, Wind NAE
Cc: geoff@activenoise.co.uk; Kovatch, George
Subject: Fw: offshore noise WT

To: U.S. Corps of Engineers
RE: Off-shore Wind Farm

For your information, please find enclosed a technical paper (daga04owea) on noise and vibrations and underwater effects on marine life during
construction of off-shore windfarms such as that currently proposed for Nantucket Sound.
I hope you find it useful.

And thanks to Dr. Geoff Leventhal (geoff@activenoise.co.uk) for sending it.

George Kovatch
Cummaquid, MA
Feb. 24, 2005
kovatch@comcast.net

Geoff,
Thanks for the paper.
George

----- Original Message -----
From: geoff@activenoise.co.ukLeventhall
To: Geoff Leventhall
Sent: Thursday, October 21, 2004 4:17 AM
Subject: offshore noise WT

Dr Geoff Leventhall
Consultant in Noise Vibration and Acoustics
150 Craddocks Avenue
Ashtead Surrey KT21 1NL UK
Tel: 01372 272 682
Fax: 01372 273 406

Underwater noise emissions from offshore wind turbines

Klaus Betke, Manfred Schultz-von Glahn, Rainer Matuschek

ITAP – Institut für technische und angewandte Physik GmbH, 26129 Oldenburg, Germany, Email: info@itap.de

Introduction

At present there are about 30 claims for wind farms in the German North Sea and Baltic areas. At the final stage, some of these farms may consist of several hundred turbines, each one with a rated power of 3 MW or more. While two medium-size offshore farms with about 80 turbines each are already existing in Denmark, the first tubines in German waters will probably be erected in 2005.

Both operation and construction of offshore wind turbines induce underwater noise, which is potentially harmful to marine mammals and fishes.

Operating noise

Vibration of the turbine's gear box and generator is guided downwards and radiated as sound from the tower wall (Figure 1). Sound radiation by surface waves is difficult to compute and to predict, in particular for complicated boundary conditions. Hence, measurements on an already existing offshore wind turbine were made. The setup is shown in Figure 2. Since access to the turbine is only possible at low wind speeds, an automatic recording was made over a one month period. At every full hour, 20 minutes of underwater sound and tower wall vibration were recorded to hard disk. The accelerometer position – approx. 10 m above sea level and perpendicular to the wall – was choosen after preliminary measurements with several sensor positions above and below sea level [1]. Wind and electric power values were taken from the turbine's routine log files.

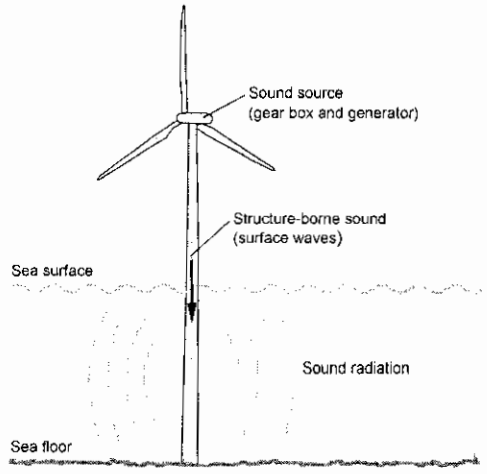

Figure 1: Mechanism of underwater noise generation by an offshore wind turbine

Some acoustic spectra are shown in Figure 3. At low wind speeds, the generator runs at about 1100 rpm, but rises rapidly to the nominal value of 1800 rpm, which is reached at 700 kW. Turbine rated power is 1500 kW. Hence there are mainly two acoustic spectra (caused by two different sets of tooth mesh frequencies), one for low wind speeds, and one for moderate and strong wind.

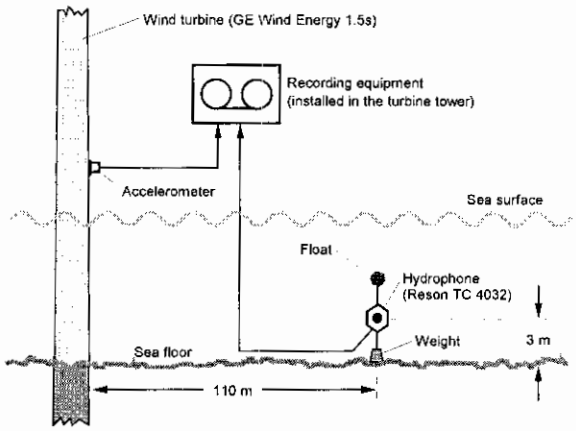

Figure 2: Measurement setup for monitoring underwater noise induced by an offshore wind turbine. Water depth was about 10 m.

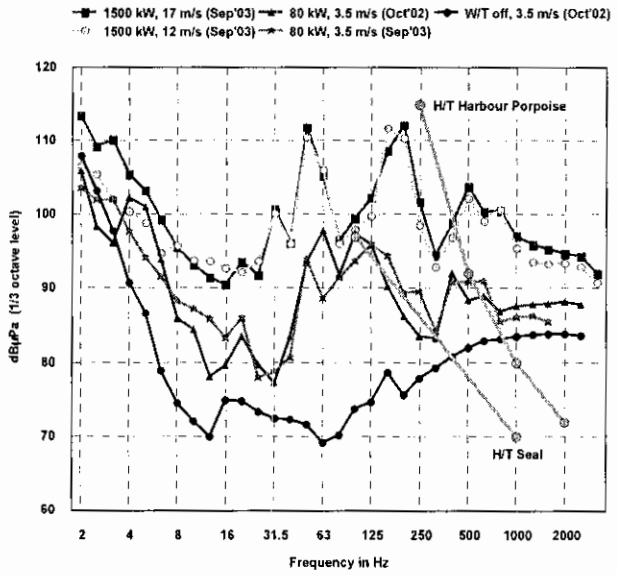

Figure 3: Underwater sound pressure levels (1/3rd octave spectra) recorded at 110 m distance from the turbine for different turbine states. Wind speeds refer to hub height (nacelle anemometer). Low frequency parts of hearing thresholds for two marine mammals are shown for comparison.

The sound levels found here will certainly not cause damage to the hearing organ of marine animals, but might affect their behaviour in the vicinity of a turbine. However, somewhat higher tower vibration levels than for this turbine type have been measured onshore on several 2 to 2.5 MW turbines. If set up offshore, these turbine models are likely to produce higher underwater noise levels than those of Figure 3. On the

other hand, the larger the turbine, the lower the tooth mesh frequencies, radiation efficiency of surface wave declines towards low frequencies, while hearing thresholds increase. At present, it is not clear if the underwater noise from offshore wind turbine will influence the behaviour of marine animals.

Construction noise

Most offshore wind turbines are built as "monopiles" with up to 6 m diameter. The tripod – a three-legged construction "nailed" to the sea floor with piles of 1.5 to 2 m – is discussed as well, but has not been applied to large wind turbines so far. In both cases, the piles are brought into the ground by means of a pile driver. Pile driving produces extremely powerful impulsive underwater noise.

Figure 4 shows the time of a single impulse recorded at 400 m distance from a pile driver. The spectrum has a broad maximum in the range 100 – 300 Hz (Figure 5). Impulse rate during these works was about 40/minute.

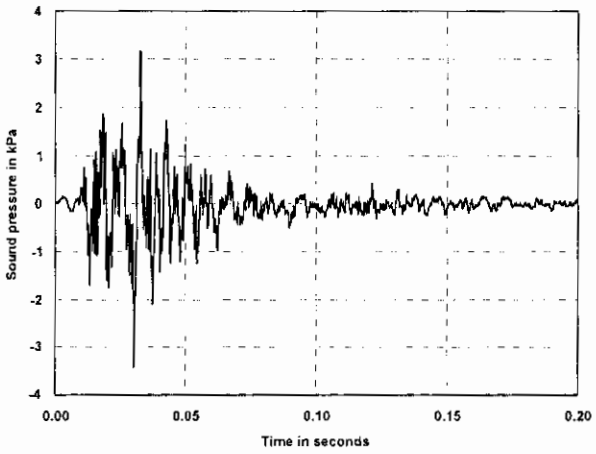

Figure 4: Time function of a pile driving impulse recorded at 400 m distance from the from the FINO 1 construction site [2]. Pile diameter was 1.5 m.

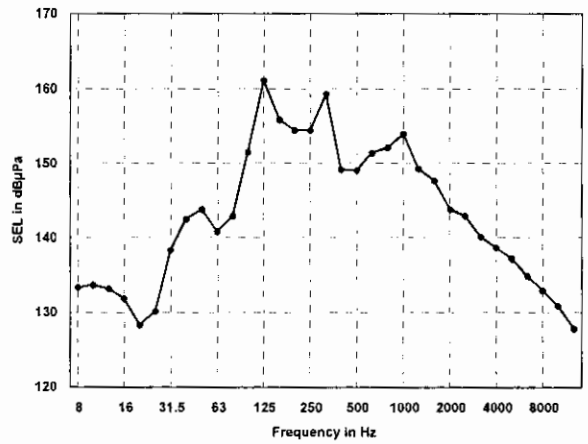

Figure 5: Spectrum of pile driving noise recorded at 400 m distance; average of 300 impulses. Note: SEL (single-event sound exposure level) is the L_{eq} normalized to an event duration of 1 second.

Impulse amplitudes of several 1000 Pa are likely to cause temporary threshold shift (TTS) in some species. But in order to estimate the biological data more precisely, a model for the level decrease with distance is necessary, in which a simple analytic formula is preferred.

North and Baltic Seas are acoustically shallow waters with neither spherical wave nor cylindrical wave propagation; level versus distance usually lies in between. Experimental data from pile driving works in the Baltic indicate a level decrease of roughly 4.5 dB per distance doubling (or 15 dB per decade; Figure 6). This is in agreement with the more detailed approximation formula given in [1].

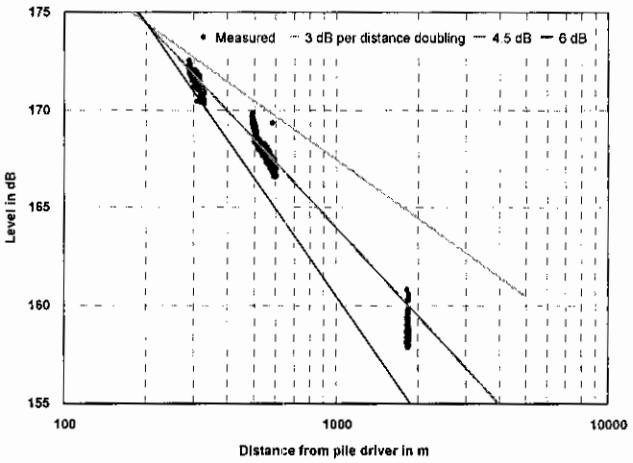

Figure 6: Measured sound levels versus distance for pile driving. The source level (measured close to the pile driver) did not vary by more than 2 dB during the whole operation.

Acknowlwdgments

This work was funded by the German Ministry of Environment (BMU) within the project *Standardverfahren zur Ermittlung und Bewertung der Belastung der Meeresumwelt durch die Schallimmission von Offshore-Windenergieanlagen.* We would also like to thank GE Wind Energy for their excellent support of the measurements at Utgrunden wind farm, Sweden.

References

[1] K. Betke et al.: Messung der Unterwasser-Schallabstrahlung einer Offshore-Windenergieanlage. In: Fortschritte der Akustik – DAGA'03, 322-323. Deutsche Gesellschaft für Akustik e.V. (DEGA), Oldenburg 2003

[2] FINO – Research platforms in the North and Baltic Seas `http://www.fino-offshore.com/`

Adams, Karen K NAE

From: Holly [amlafrance@hollygroup.com]
Sent: Thursday, February 24, 2005 8:02 PM
To: Energy, Wind NAE
Subject: cape wind project

Andrea LaFrance
106 Thornton Road
Waltham, MA 02453

Karen Kirk-Adams
Cape Wind Energy EIS Project
U.S. Army Corps of Engineers, New England District
696 Virginia Road
Concord, MA 01742

February 24, 2005

Dear Ms. Kirk-Adams:

I am writing in response to the Cape Wind Project Proposal. I object to this project proposal due to the significant damage it could and I believe will cause our natural environment of Cape Cod. Cape Cod is a national treasure and also a fragile ecosystem. I am so grateful for the few natural places we have left in our country and this is one of the most precious. The potential damage to the sea life and animals is great and far outweighs the interests of a few to risk this area for a project that seems ill-conceived to bring any real or lasting benefit to the area in terms on energy conservation, financial savings and other benefits I have heard. Once the damage is done to our wildlife, it is irreversible. We should also protect the history and cultural beauty of the area. We are the stewards of our natural resources and they should not be wasted.

The Cape's economy would also be greatly harmed by the massive blight of the project. There is simply no upside to damaging the tourism industry, one of the major sources of income to those on the Cape. Like another project, Massachusetts has become known for, this project will most likely be come weighed down by construction problems and massive cost oversights when the project already shows little financial gain. The Cape cannot afford to become another "Big Dig" project. This will again hurt greater Massachusetts tourism industry which draws people who come to visit both areas. Frankly this project should be terminated. It does not serve the public interest at all.

Sincerely,
Andrea LaFrance

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Adams, Karen K NAE

From: Janetjoakim@aol.com
Sent: Thursday, February 24, 2005 8:03 PM
To: Energy, Wind NAE; anne.canaday@state.ma.us
Subject: From A Barnstable Town Councilor

Karen Kirk-Adams
Secretary Ellen Roy Herzfelder
Thank you for taking the time to consider the following:

After following your study of this proposed project, and following the developers pitch from the beginning, it has become clear to me that too much is unknown. The bottom line here is that this entire project is an **experiment.**

I have been listening to presentations and debates about this project for over three years now.

In one of the first presentations I attended, Jim Gordon answered the question "will electricity generated by these proposed turbines, actually come in to the Cape supply? His answer was "NO, this electricity would be fed to a primary power grid off cape." Just a couple of weeks later, Cape Wind hired a PR person, At the next public hearing, held here in this room, the PR persona answered the same question – "Yes" -- and somehow the power magically would be used by the Cape/

The fact is, no one can answer any question about this project definitively.
Why?
Because a project, using these particular turbines, or turbines anywhere close to this size-
HAS NEVER BEEN DONE BEFORE.
No project currently exists that uses turbines this size, no project exists that use this many turbines –

All of the information used by the army core to make decisions about this project is based on hypotheses and estimates.

No one can site data from a previous or current project of this size or that has used the turbines proposed for this project.

Further, much of the research used has been rebutted by reputable agencies.

This risky and costly experiment can not take place in Nantucket Sound.

The town of Barnstable is taking a more responsible approach to renewable energy. Using available grants, we take advantage of the latest "green" technologies to cut energy costs, and we will be building turbines to generate electricity for our sewage treatment plant.

IF those turbines work, if the experiments are successful, then we will place these smaller turbines on or around other municipal operations to save energy.

Three years ago, I asked Jim Gordon why he could not locate this experiment further out into the ocean. His answer was simply "it is not feasible." This is all about money. Cape Wind is a "for profit" company that wants to use our precious national treasure – to generate a profit.

The federal government will go to great lengths to protect a small bird that nests in divots in the sand- they will shoot coyotes and poison seagulls to ensure the survival of this species.

Now, the federal government would give permission to independent - FOR PROFIT company to ravage and damage our delicate seabed's, endanger other species of birds, -- risk the lives of our local pilots and livelihood of our local fisherman for a risky, **for profit, EXPERIMENT?**

As someone who relies on computer technology and software for a living, I know to never use software or hardware when it is first introduced. The first edition of any software program, the first model of any new component is often considered a beta version. The manufacturers use the consumer as beta testers and work out the kinks in each newer version.
This project makes Nantucket Sound the guinea pig for beta testing a project of this size and scope.

This experiment must not take place in Nantucket sound!

Janet Joakim
Barnstable Town Councilor
508-420-2153

Adams, Karen K NAE

From: Laurie Paternoster [laurie_paternoster@yahoo.com]
Sent: Thursday, February 24, 2005 8:04 PM
To: Energy, Wind NAE
Subject: Cape Wind Project

004424

I am writing to express my opposition to the permitting by the Army Corps for the Cape Wind Project.

I am strictly opposed to allowing private industry to use public domain for profit and gain even if it is cloaked in providing "friendly" energy.

The waters, where the proposed turbines are to be located, is heavily used for fishing and recreating. In the past, we have, without proper planning, negatively impacted our environment. It would seem to me that knowing that this is a valuable, beautiful, natural marine and ocean environment we would take all the care and caution possible to insure that the good of the project far out weighs the environmental impact. I don't believe that this has or even can be substantiated.

Please deny the issuance of a permit for this project.

Thank you,

Laurie Paternoster
Centerville, MA

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Adams, Karen K NAE

From: Gloria M. Goodwin [gmgoodwin@comcast.net]
Sent: Thursday, February 24, 2005 8:12 PM
To: Energy, Wind NAE
Subject: wind energy

004425

Hi, anything that supports non-fossil fuel options is very important to me
Please support this endeavor

Gloria

Gloria Goodwin
gmgoodwin@comcast.net
617 852 1818

Adams, Karen K NAE

From: Begalic@aol.com
Sent: Thursday, February 24, 2005 8:25 PM
To: Energy, Wind NAE
Cc: mepa@state.ma.us
Subject: Comment on the Cape DEIS

Karen Kirk-Adams
Cape Wind Energy EIS Project
Reference file No. NAE-2004-338-1
U.S. Army Corps of Engineers
New England District
696 Virginia Road, Concord, MA 01742
wind.energy@usace.army.mil

004426

Secretary Ellen Roy Herzfelder
Executive Office of Environmental Affairs
Environmental Policy Act Office
Attn: Anne Canaday
100 Cambridge Street, Suite 900
Boston, MA 02114
mepa@state.ma.us

Dear Ms. Adams, Col. Koning, and Ms. Herzfelder,

I would like to ask that as part of the Cape Wind project review the Army Corps of Engineers, MEPA, and other government agencies carefully consider that for over one hundred and sixty years highly credible researchers have argued that the Graenlendinga Saga, written in 12th century Iceland and now recognized as the earliest account of North America, may contain a detailed description of Nantucket Sound.

Sincerely,

Bernard Gallagher
45-30 Court Street, #12
Long Island City, NY 11101

1.

Adams, Karen K NAE

From: GUY CLEMENTS [JUSTCL@COMCAST.NET]
Sent: Thursday, February 24, 2005 7:56 PM
To: Energy, Wind NAE
Subject: wind park project on Horseshoe Shoal

Dear Ms. Karen Kirk-Adams:

I SUPORT THE WIND FARM PROJECT LET GET DONE CLEM

Sincerely,

GUY CLEMENTS
234 MIDDLERIVER RD
DANBURY, CT 0681

001427

cc:
Capewind

Adams, Karen K NAE

From: Rachel Boehr [info@capewind.org]
Sent: Thursday, February 24, 2005 8:03 PM
To: Energy, Wind NAE
Subject: wind park project on Horseshoe Shoal

Dear Ms. Karen Kirk-Adams:

GO CAPE WIND!

001428

Sincerely,

Rachel Boehr
5 Bradshaw Dr.
Ossining, NY 10562

cc:
Capewind

Adams, Karen K NAE

From: Joan Muller [jmuller@cape.com]
Sent: Thursday, February 24, 2005 8:00 PM
To: Energy, Wind NAE
Subject: wind

004429

Hello,

When considering whether or not to give the permit to Cape Wind, please consider how much this project could improve our water quality by offsetting nitrogen emissions from power plants which contribute to the eutrophication of our coastal waters through nitrogen loading from atmospheric deposition.

If you're tallying, this is a positive for the Cape Wind project.

Thank you,
Joan Muller
22 Round Pond Drive
East Falmouth, MA 02536

Adams, Karen K NAE

From: info@lydiawarren.com
Sent: Thursday, February 24, 2005 8:08 PM
To: Energy, Wind NAE; anne.canaday@state.ma.us
Subject: Nantucket Sound

004430

Hello,
I am a resident of Sudbury, Massachusetts. I have lived in Massachusetts my entire life. My parents grew up on Cape Cod, and I continue to visit friends and relatives throughout our coastline year round. I feel the need to voice my opinion and say I strongly oppose the industrialization of Nantucket Sound! Please don't let our best treasure become ruined by private developers! Thanks for your time,

Lydia Warren
|Phone| 617.590.2105
|Email| info@LydiaWarren.com
|Web| http://www.LydiaWarren.com

Adams, Karen K NAE

From: IrishSouza@netscape.com
Sent: Thursday, February 24, 2005 8:10 PM
To: Energy, Wind NAE
Cc: frontdesk@capecodcommission.org

004431

Gentlemen: Please consider the folowing question. Has the Corps considered the impact of the windfarm on the piping plover population? As you know, the piping plover is endangered and protected. Whole tracts of land on Nantucket are off-limits to humans each summer - during peak vacation times - because as few as two or three piping plovers are nesting at Great Point, Smith's Point, and even at the Jetties Beach. Walking, swimming, driving, fishing, etc., are all interrupted to protect a few of these birds. In the case of Great Point, Islanders pay $100 for a permit for vehicular access, visitors pay $125. Access is denied when the plover comes to nest - sometimes the entirety of one's visit!!! The best fishing spots at Smith's point are similarly off-limits! It would be ironic if the windfarm dismembered these birds. Has a study baeen done to determine their flight/migration paths? I look forward to hearing from you and thank you for your attention. Sincerely, Kathleen Souza

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Adams, Karen K NAE

From: Matilda Urie [sugarski@hotmail.com]
Sent: Thursday, February 24, 2005 8:47 PM
To: Energy, Wind NAE
Subject: Cape Wind

004432

> I am writing to express my strong support for the Cape Wind Farm on Cape Cod and surrounding isslands. I think that renewable and clean energy sources are absolutly imperative for our future if we wish to continue living on a non-polluted beautiful planet. Wind power is a sustainable and non-polluting energy source, promoting cleaner air, water and soil. Too many children in the Cape area are already suffering from astham as the air poluting levels increase. Some people argue that large wind turbines would depleat the natureal beauty of the area. However, if the water is poisoned, the air is bad and the soil is dead from pollution then who cares what is on the hozizon. Anyway I dont find wind turbines unattractive, a whole lot prettier than the sky scrapers, apartment complexes and condominuims that are popping up every where.
>The Cape and surrounding islands would be an ideal place for wind energy, since there is already so much wind coming off the ocean. I strongly support the project adn hope that soon the Cape Wind Farm can be build, and start to provide clean, renewable energy for the Cape Cod area.
>Sincerely Madeline Sharrow
>
>
>
>
>---
>Do you Yahoo!?
> Yahoo! Mail - Helps protect you from nasty viruses.

Adams, Karen K NAE

From: Robert Sullivan [robert.sullivan34@verizon.net]
Sent: Thursday, February 24, 2005 8:29 PM
To: Energy, Wind NAE
Subject: wind park project on Horseshoe Shoal

004433

Dear Ms. Karen Kirk-Adams:

The time for investing in our future health and security is now. Cape Wind is an innovative and groundbreaking project that will show Americans what the future looks like - clean renewable energy that begins to correct mistakes we have made in the past when sourcing energy.

This is a project that we will all look back upon in 15 years and say "of course it was the right way to go." True leadership is about providing direction when it is missing. For America and New England, true leaders will recognize the long term potential and benefits of this project and will support it. Support means buttonholing peers to get behind the project, cutting away red tape that slows and hampers progress, and most importantly giving consumers what is best for them - renewable energy.

Sincerely,

Robert Sullivan
41 Woodman Road
Durham, NH 03824

cc:
Capewind

Adams, Karen K NAE

From: Jessica I Perez [Jessica360@aol.com]
Sent: Thursday, February 24, 2005 8:46 PM
To: Energy, Wind NAE
Subject: wind park project on Horseshoe Shoal

004434

Dear Ms. Karen Kirk-Adams:

Sincerely,

Jessica I Perez
404 Mountain Avenue
Revere, MA 02151

cc:
Capewind

Adams, Karen K NAE

From: Chris Powicki [chrisp@weeinfo.com]
Sent: Thursday, February 24, 2005 9:06 PM
To: Energy, Wind NAE; mepa@state.ma.us
Subject: Cape Wind comments

Ms. Karen Kirk-Adams
Cape Wind Energy EIS Project
U.S. Army Corps of Engineers
New England District
696 Virginia Road, Concord, MA 01742

004435

Secretary Ellen Roy Herzfelder
Executive Office of Environmental Affairs
Environmental Policy Act Office
Attn: Anne Canaday
100 Cambridge Street, Suite 900
Boston, MA 02114

Dear Ms. Adams and Secretary Herzfelder,

I offer general comments on the Cape Wind Draft Environmental Impact Statement from the following perspectives: as a Barnstable resident, Massachusetts native, and U.S. citizen; as a local business owner working in the areas of energy and the environment; and, most of all, as a concerned parent of two young children.

From every perspective, I enthusiastically support the effort to develop a wind farm on Horseshoe Shoal. However, I cannot support the Cape Wind project as proposed.

My position is not due to specific findings in the DEIS, but due to the larger failure of officials, organizations, agencies, businesses, institutions, and other stakeholders — including Cape Wind — to have a constructive dialogue about the complex and interacting economic, environmental, and social ramifications of large-scale renewable energy development on local communities.

As proposed, this project would have both negative and positive effects on local communities during its projected lifetime and beyond. Stakeholders have been unable — and, for the most part, unwilling — to discuss how to minimize the adverse local impacts and maximize the local benefits of wind energy development in Nantucket Sound.

To reconcile my support for offshore wind with my opposition to the Cape Wind project as proposed, I request that you approve this project with one key condition: The developer must negotiate with local stakeholders and work with regional, state, and federal authorities to design a public-private project that leads to a Horseshoe Shoal installation optimized from local and global perspectives.

Thank you for careful consideration of these issues.

Sincerely,

Christopher R. Powicki
100 Bayberry Lane
Barnstable, MA 02630
508.362.1901

004436

February 23, 2005

Ms. Karen Kirk Adams
U. S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742-2751

File NEA-2004-338-1

Dear Ms. Adams:

I appreciate this opportunity to offer comments on the Draft Environmental Impact Statement (DEIS) for the Cape Wind Energy Project. I also thank you for extending the public comment period on this project beyond the 45 days required. I am a full-time resident of Falmouth, Massachusetts. These comments should be considered under the following regional, state and federal statutes: The Cape Cod Commission Act, The Massachusetts Environmental Policy Act, Section 10 of the Rivers and Harbors Act, and the National Environmental Policy Act.

I personally support development of renewable energy sources including offshore wind energy. I believe that increasing the production of energy derived from renewable sources is essential to the nation's security and to the protection of its environment. Both the development of renewable energy sources and implementation of increased conservation and energy efficiency measures are essential to reducing the nation's fossil fuel use and the emissions of greenhouse gases that are clearly linked to increases in global temperatures and other projected disruptive and costly effects of human-caused global climate change. Wind energy has developed to the point where it can make a significant contribution to the nation's electricity supply in the near future. I support the responsible permitting of wind energy projects, including offshore, where they can be designed, sited and scaled to minimize harmful impacts on birds, fishes, marine mammals, other marine organisms, and existing human uses of the marine environment.

I have concerns about the particular environmental impacts of the project at this site. I also recognize that the development of wind energy, particularly at a large scale and on public lands, requires significant tradeoffs. In the case, there are tradeoffs between recognized or potential impacts on the environment and on people in the immediate project region, and any benefits that occur at larger scales associated with increasing the proportion of energy produced from renewable sources and future reductions in greenhouse gas emissions. I would like be able to evaluate these tradeoffs with the best possible information in a Final Environmental Impact Statement.

For this reason, I urge the Corps of Engineers to produce a Supplemental Environmental Impact Statement that addresses important inadequacies in the DEIS.

Assumptions Used in the Purpose and Need and Alternatives Analysis

I believe that the assumption that the Cape Wind project be compared to fossil fuel generating plants and other renewable energy facilities that produce 454 MW of electricity are fundamentally flawed. The Cape Wind project will produce, on average about 170 MW of electricity. A fairer alternatives analysis would be to compare the Cape Wind facility to equivalent-sized fossil fuel power plants. The current alternatives analysis also prevents comparisons with smaller-scaled alternative energy alternatives that may be in the public interest. The alternatives analysis also does not consider smaller facilities, a phasing in of construction of the larger facility, a facility distributed among several different locations, or a different configuration of the same number of proposed turbines. The economic assumptions that drive costs at different scales should also be included to allow evaluation of different sized alternatives. Consideration of such alternatives is in the public interest and should be a part of a supplemental DEIS.

Bird impacts

The Cape Wind project location of Nantucket Shoals is used by a variety of birds. Data collected over several years are required to assess potential impacts. The U.S. Fish and Wildlife Service and the Massachusetts Audubon Society have recommended three years of data on seasonal bird movements and abundance in and around the project area as a minimum required for the EIR. This is because bird movement and abundance can be variable within seasons and among years. The groups of birds that should be examined are: wintering waterfowl and water birds (including grebes and loons), terns (Roseate, Least and Common) and piping plovers, and migrating songbirds (passerines). The DEIS has met this 3-year criterion solely for Roseate terns during the nesting season of May to July. Additional data are required for terns during other times of the year, plovers, wintering waterfowl and passerines.

As an avid birder on Cape Cod, I am particularly concerned about potential impacts on wintering waterfowl. This is because use of Nantucket Sound by some species is high and because the populations of some species in the project area represent important fractions of the populations of these species on the Atlantic coast of the U.S. Long-tailed ducks, white-winged scoters, surf scoters, black scoters fall into this category. Their movements and populations should receive particular attention. Because some of these birds move in and out of the project area each day, nighttime surveys should be conducted to determine potential threats to these species. The nocturnal movements of passerines over Nantucket Sound during spring and fall are also a concern. Continental populations of the majority of these species are declining and the threats to passerines caused by their use of the project area should be evaluated over two years in addition to the data for 2002 included in the DEIR.

The estimate one bird death daily from the Cape Wind project is not supportable. Estimates of seabird mortality should incorporate literature from European wind farms, which include higher mortality estimates for some locations. It should include analysis of a range of mortality estimates based on the literature and estimates of the effects of these mortality rates on the western Atlantic populations of key species that are heavy users of the project area. The DEIR should contain an evaluation of the potential effects of lights on sea ducks and passerines. It should also contain an evaluation of the wind towers as a barrier to bird movement and of potential effects of displacement of birds from the project area.

Marine Animals

Nantucket Sound is used by leatherback, ridley, loggerhead and green turtles. The DEIR should contain an evaluation of the effects of the wind towers on these species.

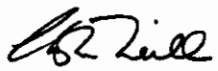
Regulatory Framework

I believe that the current framework for siting and permitting offshore wind facilities is inadequate. I support the immediate development of a process for locating wind generating facilities in Massachusetts. This process should be transparent and it should provide for substantial public input. It should include evaluate of both state and federal waters. The process should identify where development of wind energy is economically feasible and it should determine where environmental impacts are minimal. The process should outline pre- and post-project monitoring for wind energy projects. This monitoring should include evaluation of impacts on marine habitat, birds and marine animals.

I also support the passage of federal legislation to plan and lease federally continental shelf waters for wind energy. Funds from leasing of public offshore lands for wind energy should be used to create a fund to be used for coastal and nearshore habitat protection and conservation in a manner similar to the original intent of assignment of funds derived from offshore oil and gas leasing into the Land and Water Conservation Fund. I support the coordinated planning and assessment of wind energy projects among federal, state and local regulators. I believe that the existing regulatory process conducted by the Army Corps of Engineers be supplanted by new legislation. The Cape Wind project evaluated by the Corps of Engineers should be subjected retroactively to lease payments and arrangements called for by any new legislation.

Thank you for the opportunity to comment on the Cape Wind DEIS.

Sincerely,



Christopher Neill
39 Marvin Circle
Falmouth, MA 02540

Adams, Karen K NAE

From: Julie O'Neil [julieon@rcn.com]
Sent: Thursday, February 24, 2005 9:01 PM
To: Energy, Wind NAE
Subject: Nantucket Sound Wind Farm

004437

-To: U.S. Army Corp of Engineers

Re: Draft Environmental Impact Statement on the Nantucket Sound Wind Farm

Dear Sirs/Madam:

I wish to register my very deep concerns over the lack of sufficient background scientific studies and specific monitoring procedures on the effect of the wind farm proposed for Nantucket Sound on wildlife.

I do not believe that the Statement provides for relevant studies of how coastal wind farms would affect the behavior and feeding grounds of marine mammals and birdlife. Situated in shallow waters, the wind farm proposed would have very definite potential conflicts with bird migration parallel to the turbine height, as well as foraging and breeding waterfowl in the same waters.

It is a concern that wind energy - so vital to our future power needs - might find a precedent in this first-of-its-kind privately developed and highly controversial off-shore proposal. Turbine location could be sited on land (near Rte 6).

There should be first a general ocean management policy against which such a major step as this wind farm proposal would be assessed.

Thank you.

Sincerely,

Julie O'Neil
East Dennis

Adams, Karen K NAE

From: Michele Costante [carbonstars@yahoo.com]
Sent: Thursday, February 24, 2005 9:03 PM
To: mepa@state.ma.us; Energy, Wind NAE
Subject: In Support of The Cape Wind Farm

004438

As a chemist and an environmentalist I am very concerned about the
Cape Wind farm. I am very concerned that it might not be built. In a
time where global warming is a fact and the ocean levels are rising
and we continue to release hazardous gases into the atmosphere it is
imperitive that we take action to mitigate the dangers. I understand
why objections to the farm exist and they are objections based in
vanity and ignorance. I trust that as my elected representitive you
will strongly support this project that is so critical to the longterm
environmental and economical health of our Commonwealth. I urge you
to do what you can to make the Cape Wind Farm a reality.
Sincerely,

Michelle Costante

25 Ashford St
Apt 3
Allston, MA 02134

Do you Yahoo!?
Yahoo! Mail - You care about security. So do we.
http://promotions.yahoo.com/new_mail

Adams, Karen K NAE

From: Christine Fairneny [cfairneny@sched-solutions.com]
Sent: Thursday, February 24, 2005 9:36 PM
To: Energy, Wind NAE
Subject: PLEASE DENY CAPE WIND's PERMIT

004439

I attended the public hearing in Yarmouth. I heard very little opposition to wind power itself but LOTS of opposition to the developer's project location of the Cape Wind project with respect to the maturity of the technology. The public's mandate that night was for the USACE to deny this permit and put some regulations in place before destroying our oceans.

Months later these are the points that still ring clear with me:

Cape Cod's economy depends on tourism (not industry) to survive.
Every town on the Cape Cod opposes this project.
Air traffic professionals oppose the proposed location.
Fishing interests oppose the proposed location.
Boaters oppose the proposed location.
Alternative sites are available in communities that will welcome this project.
Nantucket Sound is not the place to experiment.
50 permanent jobs are not worth the risk of an oil spill.
250 temporary jobs will be filled by off cape professionals.
Gas economical cars will reduce our dependency on foreign oil more than wind.
Nantucket Sound already targeted for protection
Hurricane potential
Potential oil spill and damage to our beaches

The developer is inexperienced with this technology.
Similar projects overseas are currently being dismantled.
Maintenance and repair are manageable on land.

Please deny the Cape Wind permit.

Thank you.

Christine Fairneny
PO Box 283
Forestdale, MA 02644

Adams, Karen K NAE

From: Heather Pickering [hpickeri@risd.edu]
Sent: Thursday, February 24, 2005 9:12 PM
To: Energy, Wind NAE
Subject: Nantucket Wind Power Project

004440

To Whom it May Concern:

I recently learned that there is resistance to the Nantucket Wind Power Project on the grounds that wind turbines are considered "ugly" by certain folks. I think this is very unfortunate, since as an architect I find these machines to be extremely elegant in their aesthetic and their simple concept. Their value to clean energy is immense, and I know how crucial each an every advancement toward a sustainable future is, at a time like this.

I would like to express my support for this project--I really hope to see it happen. Any designer will tell you that wind turbines are smart and beautiful.

Thank you for your time,
-Heather Pickering

Adams, Karen K NAE

From: Jeanine Brandi [thetravelingirl@yahoo.com]
Sent: Thursday, February 24, 2005 9:14 PM
To: Energy, Wind NAE
Subject: i like windmills

004441

i am writing to show my support for the cape wind project to move forward. i am a third year graduate student of landscape architecture at risd. i was in charlie cannon's innovations studio last fall, looking at the energy issues in manhattan. i believe that we can all benefit by using wind energy.

many people make the argument that the 'aesthetics' of windmills are not pleasing. i disagree. i think that they are quite beautiful, not only because of their form, but because of the forward thinking they represent.

thank you for your consideration,
jeanine brandi

Do you Yahoo!?
Yahoo! Sports - Sign up for Fantasy Baseball.
http://baseball.fantasysports.yahoo.com/

Adams, Karen K NAE

From: Jack Beinashowitz [jbeinashowitz@comcast.net]
Sent: Thursday, February 24, 2005 9:27 PM
To: Energy, Wind NAE
Subject: wind park project on Horseshoe Shoal

004442

Dear Ms. Karen Kirk-Adams:

I am writing in support of the Cape Wind project. It is vital to develop alternative non-poluting and renewable energy sources. The Cape Wind project is an excellent example of such a resource. In my view the minor environemtal impact is well worth the benefits of the overall project. I urge you to please add your support to the project.

Sincerely,

Jack Beinashowitz
51 Sherman Bridge Road
Wayland, MA 01778

cc:
Capewind

Adams, Karen K NAE

From: Laura Krich [lkrich@rcn.com]
Sent: Thursday, February 24, 2005 9:29 PM
To: Energy, Wind NAE
Subject: wind park project on Horseshoe Shoal

Dear Ms. Karen Kirk-Adams:

nn4943

Since receiving my degree in Environmental Education in the early '70's I have been teaching thousands of students in Massachusetts about the threat of global warming and the need for clean renewable energy sources. It has been very disheartening to see the slothlike pace at which the US Government and the State of Massachusetts have responded to the growing body of scientific evidence. We need to act in these and other environmental arenas.

WE HAVE A CHANCE TO MOVE IN A POSITIVE DIRECTION WITH THE CONSTRUCTION OF THE CAPE WIND PROJECT. I enthusiastically support construction of this and other wind power projects in our state. If the winds were sufficient I would be willing to have a smaller scale windtower place in my own back yard.

I have seen the installation in Searsburg Vt and I have visited the National Laboratory for Renewable Energy wind division in Boulder CO. The new towers are elegant and graceful.

Let's take this opportunity to move in positive directions and provide a site than can provide guidance for students in the future and an opportunity to show that we can move in positive directions for humanity and the environment simultaneously.

Sincerely,

Laura Krich
58 Baskin Rd
Lexington, MA 02421

cc:
Capewind

Adams, Karen K NAE

From: JGFairneny@aol.com
Sent: Thursday, February 24, 2005 9:29 PM
To: Energy, Wind NAE
Subject: Please reject the Cape Wind permit.

004444

It amazes me that the "windiest" spot in Nantucket Sound and/or along the Massachusetts coastline, just so happens to fall in a location outside the jurisdiction of all state and local oversight.

Has the USACE learned anything from the MMR project? The lack of regulation and haphazard disposal of ammunitions has lead to soil and groundwater pollution. I view the Cape Wind project in the same light. Without local, state and federal oversight we are destined to repeat the same mistakes and spend millions of dollars to repair the predictable damage to our environment.

I implore the USACE to use a little common sense and reject this permit until proper planning, zoning and regulations have been established. There are simply insufficient regulations for a project of this magnitude.

James Fairneny,
328 Cornell St.
Roslindale, MA 02131

Adams, Karen K NAE

From: Charles Chaves [tech-sol@comcast.net]
Sent: Thursday, February 24, 2005 9:35 PM
To: Energy, Wind NAE
Subject: Cape Cod wind project

004445

Hello!

Succinctly put, rather than having the U.S. military fight and die for foreign oil, we can develop domestic energy sources such as the Cape Cod wind project. Maybe some wind turbines need to be placed some distance farther out to sea, but this clean energy project should be built to reduce reliance on imported energy.
Charles Chaves P.HD. candidate in energy sources @ Salve Regina University

Adams, Karen K NAE

From: Susan Lapine [susanlapine@wavesofchange.com]
Sent: Thursday, February 24, 2005 9:37 PM
To: Energy, Wind NAE; anne.canaday@state.ma.us
Subject: Cape Wind Project

004446

Dear Madam,
I am a full-time resident of Nantucket, Massachusetts, writing to lend my citizen voice toward your decision regarding Cape Wind Associates (CWA) application for a wind energy farm in Nantucket Sound.

My Recommended Outcomes
First and foremost: **Deny the CWA application**
Minimally: **Continue to study and review the proposed project, seeking remedies for the critical unresolved issues posed by the project**

Some Critical Unresolved Issues
Although production of renewable energy is certainly a valued outcome, there are too many critically important issues associated with this wind farm as currently proposed, in the location currently proposed, which must be resolved/worked through prior to any precedent-setting approval concerning private use of federally owned public trust property.
• **Process for Use of Public Trust Property-** Who "owns" the ocean/Nantucket Sound? Will/should rents, royalties be required? The legal authority for allowing private use of Nantucket Sound/other coastal areas should first be determined. ***Take the upfront planning time, in cooperation with appropriate state and federal agencies, to determine a sound process for determining use.*** Recently the boundary of the Commonwealth of Massachusetts was clarified, resulting in part of the proposed wind farm site being included within our Commonwealth. Governor Romney (and most of our state elected officials), on behalf of the Commonwealth, has clearly stated our opposition to the proposed project at this site. Issues of authority need to be resolved through *protocols, legislation and regulation* **before acting on the application**. A sound decision-making framework needs to be determined before precedence is set, in Nantucket Sound, or any other geographical location.
• **Aesthetic Impact-** Nantucket Sound is a national treasure, designated a sanctuary under Massachusetts law and a marine protection area under federal law. The aesthetic factor also critically impacts the economic impact of the proposed project...(see also next point). The proposed diminished land- and seascape further compromises our designated National Historic Landmarks: Nantucket Island and the Kennedy Compound, as well as numerous sites listed on the National Register of Historic Places. This wind farm would turn a publicly owned pristine national treasure into a private industrial site.

• **Economic Impact-** As aesthetics decrease in Nantucket Sound and the adjacent mainland, Cape Cod and the Islands (including my home of Nantucket Island), our major tourism industry in the area is threatened. Tourists travel here because of our pristine environment/views. A wind farm of over 130 towers, each at 417 feet above the water line (taller than the Statue of Liberty), each with a rotating arc of 321 feet, with 520 flashing navigational lights, severely diminishes the tourism draw to the current pristine land- and seascape tourists are seeking. Tourism is vital to our local economy in Nantucket Sound. Likewise, our fishing industry is vital to the local economy. The

proposed project also potentially negatively impacts the ecosystem, including fish and wildlife. Further study needs to be done. Do not compromise our livelihood and our communities with so many key issues unresolved.

• **Environmental Impact-** Fish and wildlife loss due to rotor blades/posts in the native environment/flyways needs further study. Further study is also needed regarding the potential for diesel oil spills from the proposed transformer platform. A spill would minimally severely affect Cape Cod, Nantucket, Martha's Vineyard, the Elizabeth Islands, and likely beyond...the fish and wildlife, the fishing and tourism economy. With the addition of over 130 towers driven into the seabed, the naturally shifting shoals would be interrupted, causing extraordinary shoal build-up within and adjacent to the proposed site. This affects fish and wildlife, as well as posing safety hazards to navigation.

• **Safety Impact-** This entire area is subject to *frequent sieges of fog*. During the summer season, Nantucket Airport has an average number of daily flights exceeding Boston's Logan Airport. Many commuter and private, low-flying planes fly near the proposed area. Despite the tower lights, fog poses a serious safety concern for air traffic in this area. Likewise, ice being thrown from the 321 foot arc of the rotating blades becomes a hazard even beyond the farm site. Not only is this area a flight corridor, the proposed site is ***within 800 feet*** (unlike other similar projects worldwide) of the high-use shipping and ferry lanes . Strong currents, strong winds, frequent storms, fog and building shoals, in the presence of over 130 tall towers equals a **severe hazard and threat to navigation** for planes, ships, boats (especially for this prevailing recreation area for keeled sailboats, like ours), ferries, and fishing boats.

In closing, I appreciate the opportunity to have attended the hearing here on Nantucket, and the opportunity to voice these comments **in opposition** to the Cape Wind Associates proposed wind farm in Nantucket Sound. More work is needed to create a sound process and framework. If the process is sound, the decision will come.

Susan Lapine
Nantucket, Massachusetts

Susan Lapine
Waves of Change Partnership
268 Madaket Rd.
Nantucket, MA 02554-2663

Work=508 228-5398
Cell= 508 325-1507

Adams, Karen K NAE

From: Joshua May [jdmay71@cox.net]
Sent: Thursday, February 24, 2005 9:33 PM
To: Energy, Wind NAE
Subject: wind park project on Horseshoe Shoal

Dear Ms. Karen Kirk-Adams:

004447

There is no excuse for not moving forward on the vital Cape Wind project. Energy from the environment with little or no environmental impact is a no brainer. This project does not negatively impact wildlife, boating , fishing or flight patterns in anyway? Then the only negative is that it places a distant change to the ocean views of a few wealthy homeowners.

While I can sympathize that this is an inconvenience for them, it is a tremendous economic and environmental step forward for this area of New England. Let us be forward thinking in this time of global warming. Let us be forward thinking in this time where less dependance on a volatile Middle East is in our best interest; and finally let us start to show an example for the next generation that we act on our words when we say the future of our planet is important to us. Thank You!

Joshua May

Sincerely,

Joshua May
31 Claremont Ave
Providence, RI 02908

cc:
Capewind

Adams, Karen K NAE

From: Paul Gaffuri [gaffuri@gmail.com]
Sent: Thursday, February 24, 2005 9:49 PM
To: Energy, Wind NAE; mepa@state.ma.us
Subject: give and take [letter to support cape wind]

004448

Karen Kirk-Adams and Ellen Roy Herzfelder,

Regarding CapeWind, it is a great project for our current generation but even more so for future generations of people not yet born. In the least it would begin to truly lull us out of the false life long understanding that energy from oil and coal is behind the scenes and infinite, and into the reality that it is finite. This is a chance for the people of this region to truly lead by example, to create an inspiring monument that recognizes and reacts to our need for energy and clean air. The smog that is developing is beginning to ruin MY view of Nantucket Sound, and it is also slowly changing the quality and abundance of current wildlife. That air pollution we are beginning to see was a direct result of conscious (perhaps not always informed) decisions by humans. We will now make a conscious decision to add more polution, or reduce our contribution of it. Most exciting is that we now have the means to act either way.

The wind turbines, with their visible motion create a more apparent link to our source of energy than does a non visible traditional power plant. The movement a constant reminder of our constant need for energy. Our constant co-dependancy with the earth.

I would like to help this effort in the future, how would I go about doing that?

Regards,

Paul Gaffuri

Adams, Karen K NAE

From: Charles Komanoff [kea@igc.org]
Sent: Thursday, February 24, 2005 9:59 PM
To: Energy, Wind NAE
Subject: Cape Wind comments

004449


Komanoff cover letter to Rober...


Komanoff cover letter to Doug ...


Komanoff first letter to envir...


Komanoff cover letter to Walte...


Komanoff _ 2nd Cape Wind open ...


ATT145294.txt

Feb. 24, 2005

Karen Kirk-Adams
Cape Wind Energy EIS Project
U.S. Army Corps of Engineers
New England District
696 Virginia Road, Concord, MA 01742

Dear Ms. Kirk-Adams:

Several years ago, I wrote letters to certain individuals and groups urging them to support the Cape Wind project. I was unable to make time to compose an original statement at this date for the hearing record, so I am asking if you would be willing to include five of my letters in the hearing record.

The letters are attached to this e-mail as Word documents. In chronological order, they are:

* a Nov. 27, 2002 letter to Robert F. Kennedy, Jr., whose statements opposing Cape Wind were featured at that time on the Web site of the Alliance to Protect Nantucket Sound

* a Nov. 27, 2002 letter to Doug Yearley, president and CEO of the Alliance

* a Dec. 2, 2002 "open letter" to environmental colleagues

* a Dec. 16, 2002 letter to Walter Cronkite, who at the time had spoken publicly against the Cape Wind project

* a Jan. 6, 2003 second "open letter" to environmentalists

All of the letters are attached exactly as originally written, except that I have excised the end portions of the two open letters in which I urged environmentalists to express strong public support for the Cape Wind project.

Several project parameters were changed after I wrote the letters (e.g., number of turbines, project capacity). I have kept the original numbers.

I trust you will not have qualms about making my three private letters (to Messrs. Kennedy, Yearley and Cronkite) part of the record. All three men are public figures and each took strong positions regarding Cape Wind. And the letters were sent more than two years ago. (I did not receive any replies.)

Please also include this e-mail by way of framing the five letters.

Thank you and best wishes,

Charles Komanoff
c/o KEA
636 Broadway
Room 602
New York, NY 10012
kea@igc.org

November 27, 2002

Mr. Robert F. Kennedy, Jr.
Senior Attorney
The Natural Resources Defense Council
40 West 20th Street
New York, NY 10011

Dear Robert Kennedy:

I have been struggling for a month with the news that some residents of the Cape and Islands actively oppose the Cape Wind project proposed for Nantucket Sound, and that you are among them.

After much thought and study, I've written the attached letter to the environmental community, which I'll be circulating starting Monday, Dec. 2.

I hope you will consider my arguments. We — our country, our world — desperately need renewable energy to go forward as fast as possible. We can't afford to support wind power in the abstract (e.g., as an alternative to Indian Point) but block it when it's inconvenient or esthetically displeasing. That leads to paralysis, which means more disastrous climate change and other fossil fuel-based destruction.

We need your leadership. Please reconsider your opposition.

Sincerely,

Charles Komanoff

November 27, 2002

Doug Yearley
President and CEO
Alliance to Protect Nantucket Sound
396 Main St., Suite #2
Hyannis, MA 02601

Dear Doug Yearley:

I learned a month ago that some residents of the Cape and Islands were actively opposing the Cape Wind project proposed for Nantucket Sound. Since then I've visited the Alliance's Web site, familiarized myself with the project's dimensions, and tried to place the project in a larger context of energy policy.

Through this process I've come to conclude that the Cape Wind project is good, indeed essential, for environmental progress, and that we environmentalists should be vigorously supporting, not opposing it. I've spelled out my reasoning in the attached letter, which I'll be circulating to others in the environmental community, starting Monday, Dec. 2.

As you'll see, the letter is really a plea to the members of the Alliance to try to cultivate a different feeling about the Cape Wind project — to regard the wind turbines as a visible measure of your, and all of our, taking responsibility for living on Earth

I look forward to your reply.

Best wishes,

Charles Komanoff

An Appeal to the Environmental Community to Support the Cape Wind Project

by Charles Komanoff

December, 2002

Dear colleague —

A wind energy project proposed for Nantucket Sound has run into heated opposition. This is not surprising in itself; what is surprising is that the opposition has draped itself in the flag of "environmentalism." I believe that this misappropriation of our cause is harming the progress of renewable energy and may prove damaging to the larger environmental movement as well. **I am appealing to U.S. environmentalists to make clear that they strongly support the Cape Wind project as a key element of developing large-scale wind power throughout the United States.**

To be sure, there may be important issues to be negotiated for the project, ranging from the precise siting of the wind turbines to regulatory standards for development on the outer continental shelf. But I think it would be tragic if these issues became a pretext for stopping or significantly shrinking the project.

Wind power is the only non-polluting means of generating energy that is commercially available on a large scale and can satisfy the so-called "market" criteria that govern U.S. energy supply and demand now and for the foreseeable future. Wind turbines such as those proposed for Nantucket Sound are thus the only currently viable means of providing commercial quantities of energy without destroying whole ecosystems or massively polluting our air, water and land. The Cape Wind developers anticipate producing roughly 1.5 billion kilowatt-hours a year from 420 megawatts of capacity; each unit of output will substitute 1-for-1 for the fossil-fuel mining and burning that constitutes the bulk of present energy systems both locally in New England and throughout the world.

In light of the destructiveness of all fossil-fuel extraction and power generation — which is well understood by every environmentalist — it seems clear that the Cape Wind farm will be extremely beneficial to the environment on an overall net basis. No less an authority than Dr. George Woodwell — founder and director of the Woods Hole Research Center, president emeritus of the Ecological Society of America and former board chair of the World Wildlife Fund — has stated that he does not expect the project to pose a dire threat to the region's rich bird life, and certainly not in comparison to the damage now being wreaked by the fossil fuels that the project will displace. The same holds for marine mammals and other wildlife.

Yet the home page of the Web site of the Alliance to Protect Nantucket Sound, which opposes the project, recently carried the following quote from a senior attorney for the Natural Resources Defense Council: "[The Cape Wind project will] injure a … valuable tourist industry [and] destroy a resource which is … a part of the commons … our

nation's history … and the maritime and the nautical tradition of Massachusetts." However, Nantucket Sound, to which the NRDC attorney presumably referred, will be largely untouched by the project. The Sound covers at least 300 square miles, whereas only 28 square miles — less than one-tenth of the Sound's overall expanse — will be disturbed, according to the alliance. And within that disturbed area, each turbine will lie at the center of a considerable open area, roughly one hundred acres of sea. (This assumes that the 170 turbines are distributed evenly in the 28 square miles; clustering them would reduce the total impact by allowing even more of the Sound to remain undisturbed.) Considering both the small share of the Sound that the wind farm will occupy and the large elbow room for each turbine, the NRDC attorney's alarm strikes me as disproportionate, to say the least.

More importantly, consider the tremendous prospective benefits of the Cape Wind project. If the turbines perform as anticipated, they will displace the energy equivalent of more than two million barrels of oil a year. That equates to one fully loaded *Exxon Valdez* every seven months. In just 80 days of operation the wind farm will create sufficient energy to displace the entire cargo of the shattered oil tanker *Prestige* — oil that is now befouling 300 miles of the Spanish coast and killing Atlantic bird and sea life on a vast scale. And there is the effluent as well: every week the Cape Wind project does *not* operate will result in existing power plants putting another 20,000 tons of carbon dioxide into Earth's atmosphere, with all the catastrophic consequences that we understand too well.

It is no exaggeration to say that humanity's and the Earth's prospects depend on a move to renewable energy. Fortunately, real progress has been made, particularly in wind power. The world wind industry appears to have finally attained critical mass. More than a dozen manufacturers now sell utility-scale wind turbines to developers in at least 20 countries, and installed global capacity has tripled in just five years, from 1995 to 2000.

But deployment of wind turbines has been slower in the U.S., and progress remains dependent upon strong public support so that tax breaks can offset subsidies to fossil fuels and wind farms can be sited in suitably windy areas. If the first-ever large-scale wind power project proposed for the eastern United States is stopped — and stopped in the name of "environmentalism" — this debacle will significantly slow the development of wind power, just when we need it to accelerate.

To be sure, 170 wind towers will set a clear human imprint on Cape Cod's seascape. We can all agree that wild nature is precious and that its continued presence is essential to human happiness. Dave Brower's plea for wilderness, "that a wide, spacious, untrammeled freedom shall remain in the midst of the American earth," drew me into the environmental movement over 30 years ago and continues to motivate my work and shape my life.

But the majesty of the Cape and Sound will survive the Cape Wind project. The maximum visual height of the turbines will be slightly more than one degree from the very nearest point on Cape Cod, Point Gammon; significantly less elsewhere on the Cape; and a little less than half-a-degree from Martha's Vineyard and a quarter-degree from Nantucket. In other words, from the very

nearest point on land, the tallest tower could be covered twice over with the width of your fingertip held at arm's length, and would be even less conspicuous from any other shore point. Moreover, Nantucket Sound hasn't been a pristine place for centuries. It is already a very heavily humanized stretch of water, though no less beautiful for that. Indeed, it is this fact — that a humanized world need not be an ugly one — that shows us, perhaps, the way forward.

We should appeal to the people of Cape Cod and the Cape Islands to try to cultivate a broader feeling with regard to the Cape Wind project — to regard the wind turbines not as incursions on their view but as a visible measure of their taking responsibility for living on this planet. Indeed, I would urge them to go further still, and not merely tolerate the windmills, but learn to like them, to see them as beautiful emblems of humankind's new commitment to live harmoniously in the natural world.

I offer a numerical comparison to help them do so. With the Cape Wind farm in place, Nantucket Sound's *energy density* — the amount of energy being extracted per unit area — will rise to the current level for the U.S. as a whole. Briefly: the lower 48 states cover 10,000 times as much area as the Sound, and they contain power plants generating 2,500 times as much electricity as Cape Wind is projected to produce; while this suggests that the project will give Nantucket Sound a four-fold higher *electricity* density than the rest of the country, we must also remember that total U.S. *energy* use — by cars, planes, factories, etc. — is roughly triple that of *electricity* alone. This leaves the Sound, with the windmills, with a slightly (one-third) higher energy density than the U.S. as a whole.

Is that not a lovely result? The communities around Nantucket Sound will be assuming their share, plus a little extra, of the burden for the energy we Americans use. The citizens of Cape Cod and the Cape Islands will then have moral authority to demand an energy policy based on wind and sunlight. They will have "walked the talk." If they wish — and I hope they will — they will have the credentials to become renewable-energy ambassadors to the nation and the world. And they will have done their bit with comparatively little sacrifice: they will have no infernally polluting fossil or nuclear sources, just some tall, elegant blades that spin quietly and miraculously draw energy from the air.

Let us be clear that it won't suffice to propose other sites for the turbines, or to posit energy-efficiency measures that might save energy equaling their output. The Cape Wind project is nearly ready to go, whereas there is no assurance that these alternatives would actually materialize (and hard experience tells us that they probably will not). More fundamentally, we need these other steps, multiplied many-fold, *in addition to* the Cape Wind farm, if we as a people are to actually make the transition from fossil fuels.

If all this isn't enough reason to support the Cape Wind project, consider this: In recent years we environmentalists increasingly have been disparaged as "bait-and-switch" artists who talk one way and, when crunch comes, act another. The spectacle of environmentalists exhibiting the most glaring kind of NIMBYism in this highly visible controversy will tend to discredit not just the cause of renewable energy but the entire environmental movement.

John Muir famously said, "When we try to pick out anything by itself, we find it hitched to everything else in the Universe." And so it is with energy production on today's terrible scale, and also with its antidotes.

Through dependence on fossil fuels, humankind has come to a point where an "unspoiled" Nantucket Sound is inescapably linked to spoiled climate, water, air and lungs elsewhere, and to global violence and terror. Conversely, Nantucket Sound with its clean, quiet, graceful windmills would show the way out of this dependence and to the recovery and continuance of our world.

If by accepting a modest, largely aesthetic change in the landscape we can heal the Earth to this great extent, how in conscience can we not do so?

Charles Komanoff / kea@igc.org

December 16, 2002

Mr. Walter Cronkite
860 United Nations Plaza
New York, NY 10017

Dear Walter Cronkite:

I'm one of the millions of baby boomers who grew up watching the CBS Evening News. You played a big part in my moral development. In part because of you, I became a current-events nut, winning national awards throughout high school. From African independence to JFK, from Vietnam to Three Mile Island, I not only learned the news from you, I learned that civic engagement is essential to our democracy.

In the tradition of public-spiritedness that you fostered in me, I'm writing to appeal to you to withdraw your opposition to the Cape Wind project proposed for Nantucket Sound.

As I spell out in the attached letter which I've been circulating within the U.S. environmental community, I think the Cape Wind project is good, indeed essential, for environmental progress. While I appreciate your motives, I firmly believe that stopping the Cape Wind project would be another nail in the fossil fuel coffin in which we are rapidly putting the Earth.

Please give my letter a read. I would be happy — thrilled — to meet with you to discuss our respective positions.

All best wishes,

Charles Komanoff

From Wyoming to Cape Wind: A Second Appeal to the Environmental Community to Support the Cape Wind Project

By Charles Komanoff
January, 2003

I read the Dec. 29 *NY Times* article that [was] posted here, detailing the ecological and social devastation being caused by coal-bed methane development in Wyoming's Powder River Basin. It took me back to a time 25 years ago, in the mid-1970s, when the future path of energy development was up for grabs and activists mobilized to stop the fossil-nuke industry from laying waste to natural and human communities all over the U.S.

Defending the American West from ruinous energy development was a particularly intense, gut-level part of that struggle for many of us, including me. I was living in New York then but spending as much time as I could in the Northern Rockies, hiking the high country and getting out onto the land, meeting ranchers, Indians, environmentalists and fellow eco-freaks. I fished for my breakfast in Shoshone streams, played barrelhouse piano in a Montana renewable-energy road show, and got high inhaling Amory Lovins' *Soft Energy Paths* at 12,000 feet in the Wind River range.

Natural gas, or methane, occupied a middle position in the energy debate back then. Gas was a fossil fuel, hence non-renewable, but it was less polluting than coal or oil and seemed well suited for democratically scaled small engines and generators that could later switch to quasi-renewable fuels like hydrogen. Gas could be the "bridge" carrying us from our bondage in the Egypt of oil, nukes and coal to the promised land where thermodynamically correct renewable and conservation technologies could warm our houses and cool our beer without draining our pocketbooks and plundering the planet.

Conventional natural gas deposits in the Lower 48 were running out, we thought, but there was hope that unconventional sources would take up the slack. One such source, coal-bed methane, promised to be especially simple and benign; just sink a pipe and collect the gas. A few decades later, the reality revealed in the *Times* is anything but benign: the austerely beautiful Powder River Basin is now laced with saline creeks and flammable rivers; the vast Wyoming silences are shattered 24-7 by screaming compressors; fifth-generation ranchers, their wells ruined, are being forced off the land and driven to violence.

The *Times* article is yet another reminder of the ongoing devastation wrought by America's overuse of fossil and nuclear fuels. Last month, I circulated an open letter (http://www.cars-suck.org/littera-scripta/windfarm.html) in support of the Cape Wind project in Nantucket Sound. The immediate backdrop to that letter was the destruction of hundreds of miles of Spanish coast by the spilled cargo of the oil tanker *Prestige*. The Wyoming coal-bed methane horror has spurred today's letter, but there is no shortage of relevant news: record melting of the Greenland ice sheet; dwindling glaciers in the Alps, Andes and Rockies; Appalachian forests and towns obliterated by mountaintop strip-mining of coal; and of course the daily flow of oil money from U.S. motorists to al Qaeda via the House of Sa'ud.

Against this onslaught the projected output of the 170 turbines comprising the Cape Wind project is, to be sure, a drop in the bucket: one part in 2,500 of U.S. electricity production, and one part in 7,500 of all energy consumed in the fifty states. On the other hand, 17 other proposals for off-shore wind farms totaling over 3,000 turbines have been advanced for the East Coast outer continental shelf, from Massachusetts to Virginia, according to a draft brief by the Humane Society of the United States, which opposes the Cape Wind project. In round numbers, these proposals would sum to one percent of U.S. electricity production. Add the onshore wind projects underway and proposed in California and the Great Plains, and the share multiplies. Not the 18% share that wind supplies in Denmark, far from it, in fact, but clearly getting somewhere.

"Wind clutter," the towers and turbines are already being called. For me, this is a sourly evocative phrase. When cyclists locked their bikes to poles outside the World Trade Center, the Port Authority guys called it "bike clutter" to justify clipping the locks and taking the bikes. That was in 1990, before global warming from burning fossil fuels had manifested itself beyond any doubt, before Gulf War I (or II) had set the Middle East afire, and of course before the twin towers themselves were reduced to ashes. And before some residents of Cape Cod — among them, we may be certain, shareowners in the corporations taking the methane out from under the ranchers in the Power River Basin — rose up to stop the Cape Wind farm from "cluttering" Nantucket Sound.

Clearly, these are people with an exceptional sensitivity to "clutter." From four miles — the closest approach of any of the Cape Wind turbines to land — the full height of a tower could be covered twice over with the width of a fingertip held at arm's length, as I noted in my earlier letter. But regardless, the more windmills the merrier, I say. Not just to multiply the numerical displacement of fossil fuels but to make manifest the existence of an alternative — and to take the dirty secret of energy production out of the shadows of West Virginia and Wyoming and Kuwait and put it squarely in front of our picture windows.

The value of the windmills, I am arguing, goes beyond energy-share percentages to the plane of symbols and images. That is the realm where the ecological high ground has been pulled out from under us, where the masses of people have been acting out their desires — choosing the manly SUV over the prim Prius, the macho snowmobile over the effete snowshoes, the chic halogen lamp over the clunky compact-fluorescent. Perhaps the windmills, captivating and alluring, can spark a change in popular conceptions of what is desirable and help steer individual and public choices in a different direction.

I personally find the windmills magnificent, and I believe others will come to see them the same way. Whether it's form or function I can't say, to me the two are indivisible. The slowly rotating blades draw energy from the air and in effect put fossil fuels back in the ground where they can't do harm. It's a form of magic, is it not? And people want magic, they want beauty, they want tangible ways of living on Earth without destroying it. Seeing the beauty in windmills could be a turning point, making possible a wider appreciation of what are now, we should admit, a beleaguered minority's values: trust in energy efficiency, devotion to conservation, identification with the natural world.

We need to start somewhere — the losses are becoming unbearable — and we might as well start with Cape Wind. Granted, this is quite a burden to load onto one project. But the Cape Wind project is no little matter; it is already a big issue in New England and has the makings of a national cause célèbre. As I wrote last month, the spectacle of well-heeled environmentalists writing checks to "green groups," while blocking a wind-energy project in their backyard, discredits not just the cause of renewable energy but the environmental movement as a whole. (A friend in Houston reports that the project is constantly brought up in polite conversations there as proof of the double standards of environmentalists.) Conversely, Nantucket Sound graced with clean, quiet windmills would begin to show the way out of our suicidal dependence on fossil fuels and toward a way of living in harmony with the natural world.

Sincerely,

Charles Komanoff / kea@igc.org

Adams, Karen K NAE

From: Gary Conway [jill12@comcast.net]
Sent: Thursday, February 24, 2005 10:12 PM
To: Energy, Wind NAE
Subject: wind farm

004450

Please invoke a stop order or minimally a moratorium to suspend any further deployment of this project in Nantucket Sound. I certainly support the creation and deployment of alternative forms of energy but not at the expense of our natural resources. I think this type of energy can be deployed without compromising our future and we should take a leading role for our country and not be too quick to approve the current location without a comprehensive review of all potential locations, let's move prudently not recklessly. Thank you in advance for your consideration.

Gary Conway

Adams, Karen K NAE

From: Hank F. [cobra8@comcast.net]
Sent: Thursday, February 24, 2005 10:24 PM
To: Energy, Wind NAE
Subject: "Wind Farm"

004451

Greetings,

I am writing to express my grave concern about the proposed "wind farm" to be located in Nantucket Sound. I have been a resident of Barnstable (north side) for 44 years and am a retired commercial banker who made a good living financing commercial projects on Cape Cod and southeastern Mass. I understand the value of risk taking and the need for local businesses to generate profits to help build a strong community. I applaud Cape Wind for their creativity and commitment to this project, but then their potential reward is huge.

I am very much in favor of developing economically viable alternative energy, but I am adamantly opposed to the initiative by Cape Wind to plunder our incredible resource, Nantucket Sound, for Cape Wind's personal gain. A gain, incidentally, that is fostered by taxpayer subsidies. There are numerous alternative land based sites that have been suggested due to their innocuous impact, so why not pursue them?

To me, the potential benefit that might accrue to the citizens from such a wind energy generating facility does not come close to offsetting the potential risk to our fragile environment and economy. Surely the USACE must understand the risk/benefit of this project, and have considerable concern about the viability of such a long term venture as well.

Thank you for the opportunity to comment, now please let my family live out our retirement in the comfort of knowing that the USACE did not allow the advertised rape of Nantucket Sound to occur. Please preserve our national treasure- Nantucket Sound.

Very Truly Yours,

Henry C. Farnham
127 Coachman Lane
West Barnstable, MA. 02668

508-420-2041

Adams, Karen K NAE

From: Donna Devin [donna.devin@comcast.net]
Sent: Thursday, February 24, 2005 10:01 PM
To: Energy, Wind NAE
Subject: Wind Farm

004452

Please reject the Cape Wind permit.

These large industrial projects do not work. Lets look at the Big Dig. This project won all kinds of awards for engineering 1sts but $14 billion dollars later, all it saved was 3 minutes from the south shore commute.

Lets use a little common sense. The proposed wind farm will do nothing to reduce electric prices (when was the last time your electric bill went down?) and/or our dependency on foreign oil. Why destroy our oceans in the process? As Americans we should shut the lights when we leave a room and buy fuel-efficient cars.

It may help us test the technology but lets do that at a smaller scale on land, where the turbines can be maintained easily and there is state and local oversight of the project.

Donna F Greene
Mashpee, MA

Adams, Karen K NAE

From: Morris Purnell [lobivia1@aol.com]
Sent: Thursday, February 24, 2005 10:25 PM
To: Energy, Wind NAE
Subject: wind park project on Horseshoe Shoal

Dear Ms. Karen Kirk-Adams:

004453

Please count me among the Massachusetts property owners and taxpayers who are strongly in favor of construction of the Cape Wind project.

Morris Purnell

Sincerely,

Morris Purnell
12 Housatonnuck Rd
Stockbridge, MA 02162

cc:
Capewind

Adams, Karen K NAE

From: Anna Manatis [AnnaManLor@aol.com]
Sent: Thursday, February 24, 2005 10:27 PM
To: Energy, Wind NAE
Subject: wind park project on Horseshoe Shoal

004454

Dear Ms. Karen Kirk-Adams:

In response to the numerous letters for and against the Wind Farm you have received I would ask you to consider your position in light of the strong evidence that has come forth in support of global warming. The world is changing and unfortunately, so is the climate.There is clear evidence that the polar ice caps are melting and Greenland from arial shots has pools of water where previously there was ice. The 1990's have been noted to be the warmest decade in the last 100 years and all groups have decided the climate is indeed getting warmer, though now the only despute is by how much.

As a physician, my concerns are focused on specifically the influence these changes in temperature and climate will have on health. It is well known that the elevated temperatures can lead to heat related illness and death. This was witnessed in Europe this past summer. However, another concern are the food borne and water borne diseases that are resulting from the increased flooding. We have already seen the emergence mosquito and rodent borne diseases due to the changes in climate. These diseases inlude Lyme disease, which you know is endemic to the Cape.

What needs to be asked is what are we doing to reverse the trend and what can we do now? Changing from burning fossil fuel to alternative forms of energy is critical in reversing the trend. There are measurable outcomes and we should be looking at ways to immediately change what we are doing and then monitor our progress in decreasing the levels of CO2 in our environment.

The Cape Wind Project is one of the projects that should begin the push towards alternative energy production. This project would produce 3/4 of the energy needs of the Cape in addition to not adding any CO2, SO2 or NOx to the environment. It is only the beginnning, but we have to start somewhere and we cannot afford to continue to put off the inevitable.

Sincerely,
Anna A. Manatis, M.D.
Internist, East Sandwich, MA
MPH student, Harvard University School of Public Health,

Sincerely,

Anna Manatis
13 Fort Hill Road
East Sandwich, MA 02537

cc:
Capewind

Adams, Karen K NAE

From: Jonathan Marsh [jhmarsh@optonline.net]
Sent: Thursday, February 24, 2005 10:53 PM
To: Energy, Wind NAE
Subject: wind park project on Horseshoe Shoal

004455

Dear Ms. Karen Kirk-Adams:

I would like to voice my support for the cape wind project. I do not believe it will do anything to take away from the beauty of the coast. I have seen similar things in other locations (both in pictures and in person) and think they look nice. They are certainly more captivating than the so-called art on exhibit in Central Park for the next 1 1/2 weeks. Even if I were to detract from the view, it would be worth it because of the benefits of clean energy. Please let this project proceed. Jonathan Marsh M.D.

Sincerely,

Jonathan Marsh
6 Engineers road
Roslyn Harbor, NY 11576

cc:
Capewind

Adams, Karen K NAE

From: Robert Reynolds [robertdotreynolds@hotmail.com]
Sent: Thursday, February 24, 2005 11:00 PM
To: Energy, Wind NAE
Subject: wind park project on Horseshoe Shoal

Dear Ms. Karen Kirk-Adams:

004456

With emerging countries like China, India, etc. competing fiercely for limited petroleum futures contracts, it is imperative that we in the United States develop renewable methods of energy production so we can maintain our economy and our way of life in the face of this changing world. It is incumbent upon the government leaders at all levels to use their power and influence to promote simple, fair, and consistent means of determining which renewable energy sites are appropriate and will serve local, state, and national interests.
Trying to kill a project by piling on bureaucracy for selfish interest purposes is an inappropriate use of the public's trust.
Wind power is unique in that it possesses attributes valued by both the '60's liberals and corporate conservatives. Both of these groups, and all between, should be enthusiastically supporting these projects.
Cape Wind is good for industry, communities, the environment, and will help secure our way of life in the United States for many decades to come.
Please consider the wider implications when each of you makes decisions that effect not only the Cape Wind project, but also set precedence that will determine the viability of future renewable energy projects.

Thank you for taking the time to consider this point of view.
Robert W. Reynolds
Troy, N.Y.

Sincerely,

Robert Reynolds
141 Carrolls Grove Rd
Troy, NY 12180

cc:
Capewind

Adams, Karen K NAE

From: acanedy@comcast.net
Sent: Thursday, February 24, 2005 11:02 PM
To: Energy, Wind NAE
Subject: Cape Wind Project -Nantucket Sound

004457

Dear Ms. Karen Kirk-Adams:

I am an elected Barnstable Town Councilor. I **want to express my opposition to siting wind turbines in Nantucket Sound** without a viable and enforceable ocean management plan in place.

Although the Town Council is closest in proximity to the project and closest in representation to the citizens most affected, unfortunately we have had and will have no input in its creation, operation, maintenance, or siting. This is an absolutely unsound precedent.

As a Town Councilor, I am responsible in part for creating and enforcing zoning ordinances for land use within the Town of Barnstable. As Town leaders, we strive to control the quantity and quality of growth by incorporating smart growth principles. We have created the framework within which we want development to occur. We balance our economic, historic, and environmental issues in a common sense way by employing the tools of our administrative code and zoning ordinances and by drawing on the expertise of our constituent committees. Just as we insist on a framework and a process in dealing with land transactions, we should insist on a framework and a process at sea. Just as we do not allow squatting and land grabs in real estate on land, we should not allow it at sea.

The Sound is a valuable pristine public natural resource which should not be developed by any private developer *without and until* the establishment of a comprehensive national and regional system of ocean management and maintenance. Without that, the Sound will be harvested by public and private interests without constraint.

Thank you for considering my concerns. A copy of this letter was sent to you by email at wind.energy@usace.army.mil.

Sincerely,

Ann B. Canedy

Barnstable Town Councilor-Precinct One

--
Ann B. Canedy
Barnstable Town Council Precinct 1
Box 23, Cummaquid, MA. 02637

3/3/2005

Adams, Karen K NAE

From: Harryaa@aol.com
Sent: Thursday, February 24, 2005 11:09 PM
To: Energy, Wind NAE
Subject: Cape Wind Support

004458

Dear Ms. Kirk-Adams;
This is to inform you of my support of the Cape Wind Project.
I am a part-time, semi-retired, consultant to energy engineering/design companys. I have 50 years experience as a design engineer/consultant in the field of fossil-fueled electric generating plants.
I see the Cape Wind Project as a great step forward for the Commonwealth of Massachusetts in realizing more electric power production from renewable sources with minimal impact on the environment. Massachusetts wants to avoid coal-fired and nuclear plants, and they can't go on thinking they can import electricity from out-of-state. Natural gas & fuel oil, if available, will be expensive and will pose delivery problems. Massachusetts wants to go in the direction of renewable energy, and this project provides a significant and great example of what can be accomplished toward that goal.

Sincerely, Harry A. Ainsworth
44 Maple Avenue
Sudbury, MA 01776-3441

Adams, Karen K NAE

From: Ejmssk@aol.com

Sent: Thursday, February 24, 2005 11:34 PM

To: Energy, Wind NAE

Subject: Cape Wind Energy 2/24/05 (a deadline messasge!) 004459

Ms. Karen Kirk-Adams-Project Manager
Proposed Offshore Wind Project in Nantucket Sound
U.S.Army Corps of Engineers, New England District

Re:Corps invitation for comments from the Public

Dear Ms. Adams:

I respectfully appreciate the Corps time and effort to consider these comments.

I oppose placement of offshore wind generators in Nantucket Sound. This stems from a personal experience I enjoyed for its uniqueness, and beauty, and for many fond memories it has evoked having sailed on Nantucket Sound.

In l967, I and three colleagues (all at that time engaged in Electric Boat's important overhaul program of the Polaris class nuclear submarines that played a critical role protecting the United States during the Cold War) rented a 40' sailboat for a week and sailed to Block Island-Nantucket-Martha's Vineyard. All special recreational spots in our New England.

It was 3 a.m. when we sailed through Nantucket Sound, waves jumping to heights of 4' + - no radar on this rented craft-our "Captain" was a Kings Point graduate, and we were a condusive, cooperative bunch of guys-seeking adventure. We anchored safely in Nantucket Harbor after making the run from Block Island. Thank goodness.

Had there been 100 + towers throughout the Sound I believe you would agree that the risks and hazards they would have presented to our small craft would be real.

Therefore I believe installation of generators creates an unnecessary risk for future young and
elderly sailors-who also may not be equipped with radar, and may find themselves contending with fog or haze or other unforeseen obstacles that may offer unsafe conditions in addition to towers if they were there.

My hope and plea is to keep this beautiful portion of the Atlantic Ocean open, clear, and thus inviting for future adventurous souls who enjoy the sea. In appreciation,

Sincerely,
Edward(Ned)Macomb
36 Wildwood Avenue
Madison, Ct. 06443
tele.(203) 245 7040

Adams, Karen K NAE

From: lt226@comcast.net
Sent: Thursday, February 24, 2005 11:30 PM
To: Energy, Wind NAE
Cc: mepa@state.ma.us
Subject: Cape Wind Comment

004460

Karen Kirk-Adams
Cape Wind Energy EIS Project
Reference file No. NAE-2004-338-1

U.S. Army Corps of Engineers
New England District
696 Virginia Road, Concord, MA 01742
wind.energy@usace.army.mil

Secretary Ellen Roy Herzfelder
Executive Office of Environmental Affairs
Environmental Policy Act Office
Attn: Anne Canaday
100 Cambridge Street, Suite 900
Boston, MA 02114
mepa@state.ma.us Dear Ms. Adams and Ms. Hertfelder,

Dear Ms. Adams and Ms. Herzfelder,

My name is Laura Taylor. I am seventeen years old and I live in Berlin, Connecticut. I have been vacationing with my family on Cape Cod each summer since I was born. I am writing to express my strong opposition to the Cape Wind Project. Nearly all the claims made in favor of the Cape Wind Associates plan to industrialize Nantucket Sound are, in my opinion, suspicious. One of their stated □public benefits□ in particular compels me to write to you. I have had asthma since I was three years old and it bothers me tremendously when I hear Cape Wind Associates and their supporters state this power plant project will help people who suffer from asthma. I do not believe for a moment that wind turbines in Nantucket Sound or anywhere else will cure or prevent asthma or any other respiratory disease. It is obvious Cape Wind Associates and their supporters are using concerns about asthma as propaganda in hopes they can influence public opinion.

Please study information available on the website of the Annapolis Center, □a national non-profit educational organization that supports and promotes responsible energy, environmental, health and safety decision making□ www.annapoliscenter.org

Nearly all the reports on the Annapolis Center web site should interest the U.S. Army Corps of Engineers and MEPA. At least two studies deal directly with the issue of asthma and air pollution. They question the popular perception that a direct connection

exists between power plant emissions and asthma.

□Asthma and Air Quality□.
http://www.annapoliscenter.org/skins/default/display.aspx?mode=user&ModuleId=2a285ab0-5db1-4f36-9b91-f2263c973c32&action=download_resource&ObjectID=459a0530-6205-437a-a1e2-4e4a31a096aa&IgnoreTimeOut=true

□Asthma: Separating Facts from Fiction; Is air pollution the cause of the increase in asthma?- □A prominent panel, chaired by Dr. Koenig, to review the current science on this disease and separate the facts from the myth. □

http://www.annapoliscenter.org/skins/default/display.aspx?mode=user&ModuleId=2a285ab0-5db1-4f36-9b91-f2263c973c32&action=download_resource&ObjectID=6fb61fa5-4226-4cc8-9729-d57711c25634&IgnoreTimeOut=true

The following report also questions commonly held ideas about power plant emissions and public health;

"Critique of "Dirty Air, Dirty Power," a report by Clear the Air"
"The "Dirty Air, Dirty Power" (DADP) report claims emissions from coal-fired power plants cut short nearly 24,000 lives per year and cause many other adverse health effects. A careful review of the DADP report, the June 2004 Abt Associates Inc. report on which it is based, and the underlying science related to power plant pollution and its possible health effects reveals that the DADP report is grossly misleading."
http://www.annapoliscenter.org/skins/default/display.aspx?mode=user&ModuleId=2a285ab0-5db1-4f36-9b91-f2263c973c32&action=download_resource&ObjectID=dd8ab4c8-2ada-47c9-a23a-2d0579d9da2d&IgnoreTimeOut=true

Another report on the Annapolis Center website deals directly with the issue of renewable energy□

□Electric Power from Renewable Energy □ Practical Realities for Policy-Makers□
□Current renewable technologies are incapable of providing the all-renewable electric power in the future that many have envisioned."

http://www.annapoliscenter.org/skins/default/display.aspx?mode=user&ModuleId=2a285ab0-5db1-4f36-9b91-f2263c973c32&action=download_resource&ObjectID=56856891-851d-4d24-a5a5-feb3d107a7f5&IgnoreTimeOut=true

I would like to close by emphasizing that I do not want to see Nantucket Sound ruined by this private, for-profit, industrial project. I strongly oppose construction of the Cape Wind project and I hope that the U.S. Army Corps of Engineers will oppose it too.

Yours truly,

Laura Taylor
1122 Worthington Ridge
Berlin, CT 06037

3/3/2005

Adams, Karen K NAE

From: Stephen Buckley [govminders@earthlink.net]
Sent: Thursday, February 24, 2005 11:29 PM
To: Energy, Wind NAE
Subject: DEIS Comments: File No. NAE-2004-338-1

004461

Dear Army Corps of Engineers,

I would like to make a suggestion about improving the aesthetics/economic impact portions of the Draft Environmental Impact Statement (DEIS) on the permit application for the Cape Wind proposal for Nantucket Sound (File No. NAE-2004-338-1). To do so, I need to first tell you a story.

When I was a young boy, I remember visiting Harding's Beach in Chatham and looking out over the waters of Nantucket Sound. As I scanned the horizon over the water, I saw what looked, from a distance, like a string of toothpicks.

This looked kind of curious to me, so I asked my mother what those "sticks" were. She told me that they were the poles for "fish-traps" that caught fish in the nets strung between them. I believe my reaction at the time was something like "Oh."

I don't remember being bothered by my first sight of these "sticks on the horizon". In fact, in the 40 years since that time, I have visited that beach many, many times, often accompanied by friends visiting from all over the world. If I was asked by my friends to explain the "sticks" on the horizon (and I probably was), then I am sure I would have recalled any negative reaction to their appearance since, as a Chatham native, I am very proud of the reasons that people vacation here.

But I do not recall any of those visiting friends who accompanied me to Harding's Beach as referring to those "sticks on the horizon" in a negative way.

My family rents summer cottages near Nantucket Sound, and we always point them to Harding's Beach as the nearest beach. In all my years of talking with those summer visitors, I have do not recall any visitors to Harding's Beach referring to those "sticks on the horizon" in a negative way.

As I understand it, there are several areas around the Cape where such "sticks on the horizon" (i.e., fish-traps) exist. I have never heard any public clamor about their effect on the aesthetic value of the Cape's vistas, nor of any effect, therefore, on the local tourist trade.

I suggest that you check into what I am saying and, if true, include something in the DEIS about the apparent lack of controversy/impact that the existing "sticks on the horizon" have on aesthetics or the local economy.

To see what a Cape Cod fish-trap looks like (up close), go to:
http://www.aquanet.com/features/fishtrap/trap1.htm

Unfortunately, I do not have a picture of what a fish-trap looks like on the horizon, but if you want to find out more about the fish-traps in Nantucket Sound off of Harding's Beach, I suggest that you contact Ms. Shareen Davis, of Chatham, who co-owns those fish-traps. She may also be contacted through the Association to Protect Nantucket Sound, where she is Outreach Coordinator.
http://www.saveoursound.org/About/Team.aspx

I am former federal environmental engineer, with 25 years of experience in environmental compliance, specializing in the development and review of Environmental Impact Statements.

I also have been the moderator of a neutral email-newsgroup on this topic for the past three years. A listing of the postings to to that group (e.g., references to notices, hearings, documents, etc.) are at: http://groups.yahoo.com/group/capecodwindfarmNEWS/messages

This is the first time that I have made a statement that could be construed as either for or against the proposed project. But I am not making this statement to influence the final decision; all I want is for the final EIS to be accurate, and as informative as possible for the final decisionmaker.

If you have any questions about my suggestion, please let me know.

sincerely,
Stephen Buckley
P.O. Box 854
West Chatham, MA 02669
(508) 945-0518
govminders@earthlink.net

Adams, Karen K NAE

From: Patricia Walker [paw@capecod.net]
Sent: Thursday, February 24, 2005 11:30 PM
To: Energy, Wind NAE
Cc: comments@saveoursound.org
Subject: Wind Farm

004462

Thank you for the extended period of public comment.

Aside from the oil spill risk, the navigation hazards, the blight on the landscape, and the use of public lands for private profit: what no one seems to be talking about is the fact that the law requires the energy commission to buy "x" amount of power from renewable sources. There are currentlly no renewable sources in Massachusetts.
AND, there is no regulatory cap on what the proposed wind farm can charge for their power. It is resonable to think that Cape Codders will soon find their electric bills doubled on top of the visual insult. PLEASE DO NOT ALLOW THIS PROJECT....NOT NOW NOT EVER.

patricia Walker
403 Stony Brook Rd.
Brewster, MA 20631
508.385.3613

Adams, Karen K NAE

From: Daniel Goldman [dgoldman@newenergycapital.com]
Sent: Thursday, February 24, 2005 11:28 PM
To: Energy, Wind NAE
Subject: wind park project on Horseshoe Shoal

Dear Ms. Karen Kirk-Adams:

As a resident of MA and investment professional, I care deeply about our economic and environmental future. I also recognize the sacrifices and trade-offs involved in the choices we make about our energy future. It is with total disgust that I witness the parties trying to block the Cape Wind project for self-benefit. I wholeheartedly support this project, whether it is in my backyard or a far off place. With ease, we locate dirty power plants in inner cities and poor towns. Now we have an opportunity to balance the power and level the playing field by harnessing a renewable resource and reducing our use of fossil fuels; and while doing so, improve our country's security in the world at large, which is something we all must recognize as critically important in a post-9/11 world.

004463

I submit this letter to offer my support for the Cape Wind project. I hope the project receives all the necessary approvals and moves forward in a short period of time.

Kind regards,
Daniel P. Goldman
Chief Financial Officer
New Energy Capital Corp.

Sincerely,

Daniel Goldman
39 Colbert Road East
Newton, MA 02465

cc:
Capewind

Adams, Karen K NAE

From: John Payne [johnpmd@earthlink.net]
Sent: Thursday, February 24, 2005 11:27 PM
To: Energy, Wind NAE
Cc: comments@saveoursound.org
Subject: Against the wind farm

004464

Be it known that Mr. and Mrs. John H. Payne of 709 Oak Street, West Barnstable, MA 02668 do not favor approval of the wind farm in Nantucket Sound. This wind farm does not serve our best interests. We consider such use of the waterways as highly inappropriate.

John and Joyce Payne

Adams, Karen K NAE

From: Beverley Evans [bevevans@comcast.net]
Sent: Thursday, February 24, 2005 11:21 PM
To: Energy, Wind NAE
Subject: My comments against the wind power in Nantucket Sound

To Whom it May Concern,

004165

I do not believe your report was adequate.

I wish to say I am completely against putting windmills in Nantucket Sound for the following reasons:

We need to protect the sound -- not only for the natural beauty but for the natural and environmental reasons many have listed - birds, fish,shellfish, fisherman's livelihoods, the ferries to the islands, pollution of air and water and from the oil used on the transformer station, visually negative -- who really wants to look at these?, economic and impact on tourism, water quality and destruction of natural beauty which belong to all -- not Cape Wind.

I have seen these wind farms in California (which I did not know existed when I came upon them) and they are really a blight on the beautiful countryside and I would not want to see them in Nantucket Sound.

I also do not feel a single person should benefit from using property that belongs to all of us to make a profit. Cape Wind may say they will provide energy for people but it is possible these machines will not work or break down and who will remove them? But really no one should make a profit out of public land or ocean in the United States of America. Many business people are always looking for loopholes as Cape Wind has done to make money at the expense of others and this should not be allowed--at least not in Nantucket Sound.It must be protected. This is a dangerous precedent to make re the use of our oceans.

Your environmental Impact Statement is inadequate in many areas as I have listed above in this e mail.There is also no benefit to the people who are residents of the Cape and Islands.

I was appalled at the meeting for comments at MIT which I attended. It appeared to me the people who spoke FOR the project were probably paid by Cape Wind and had been brought in for their comments and I expect they had been recruited and paid for their time. It was positively disgusting and a real tragedy of justice and waste of many peoples time as I understand they got there very early to sign up and also they had a huge cheering section which in my opinion was totally inappropriate. It was a sham! It was not a meeting where all sides were heard.

Thank you

Beverley Evans
29 Coolidge Hill Road
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Adams, Karen K NAE

From: bajdek@netzero.com
Sent: Thursday, February 24, 2005 11:39 PM
To: Energy, Wind NAE
Subject: Written comment on Cape Wind EIS (File No. NAE-2004-338-1)

Reference file no. NAE-2004-338-1

004466

Karen Kirk Adams
Cape Wind Energy Project EIS Project Manager
Corps of Engineers, New England District
696 Virginia Road
Concord, MA 01742-2751

I am writing, on my on behalf, in support of the wind energy facility that is being proposed by Cape Wind Associates for Nantucket Sound. I am a member of a conservation group in my town, and also serve as a land steward for a piece of conservation land in town. While I have some reservations about the private use of public lands, I nevertheless feel that this project must move forward in an effort to limit our dependence on oil, especially foreign oil. I believe that, if approved, the proposed project represents a much needed first step in the process of developing truly sustainable communities within the Commonwealth.

I'm sure few would argue that there is a finite and dwindling supply of fossil fuels available for energy production. Some members of the oil industry have stated that at current levels of consumption, world-wide oil reserves are expected to last for another 40 to 60 years. While it seems that there is nothing to worry about in the short-term, it is not too soon - and hopefully it is not too late - to start planning for the day when world oil reserves have been completely exhausted.

Christopher Bajdek
Holliston, MA